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Faith Oil Problems Will Be Conquered, Features Institute Meeting

Staff Special

WASHINGTON, Nov. 20

OPTIMISM, resolute faith in the future, was the prevailing spirit at the first annual meeting of the American Petroleum Institute which closed its three-day sessions, November 17, 18 and 19, with a banquet at the New Willard Hotel here last night. The attendance was truly representative. The visitors—there were close to 400 registrations — included heads and higher executives of the biggest companies, heads and members of big and little refining companies of the east and of the west, marketers, jobbers, producers and pipe line men.

Many of those present did not hesitate to declare that the meeting was the most important event in the history of the oil business. One outstanding feature of the meeting was that the men present were able to forget the temporary troubles that are besetting some of them, due to the industrial depression, and to envision the oil problem and the oil industry as worldwide in scope and significance.

All thru the sessions and wherever men got together in groups to talk it over, three convictions of the American oil industry were apparent. One is that it is no longer a question of finding a market for the oil that can be produced and manufactured, but that it is now and will continue to be to an even greater extent every year, a question of obtaining enough crude to supply the world's insatiable demand.

The second is that the future is safe; that crude oil resources will be developed sufficient to supply that demand.

The third is that to insure production that will meet the growing demand thruout the world, the oil business of this country must be left free to use its own invention, initiative and enthusiasm, unrestricted by government regulation except such as may be necessary to check any misuse by the industry of a natural resource.

These convictions were voiced by practically all principal speakers, each in his own language, and they were told by means of charts and compilations of figures.

Thomas A. O'Donnell
Re-elected President of American Petroleum Institute

The dropping off in production of our known oil fields was recognized, the great cost of drilling wells now to renew that depleted production was taken into account, the water encroachment in the Mexican fields, hitherto considered well nigh inexhaustible, was discussed in its relation to crude supply. Against this other speakers talked of a crude demand of 700,000,000 barrels for next year perhaps, of a demand for a billion barrels of crude to come within the next few years.

The temporary depression in industry, even as it affects business generally and the oil industry indirectly, was not even mentioned during the three days' session. The problem of the future, meeting the constantly expanding demand for oil products, were so much more engrossing that it completely eliminated from discussion any question of what prices may do the next few months. Of much greater importance was it that the oil men generally have some understanding as to what the needs of the oil business for new capital will be the next few years if the oil supply is to be kept up, to be increased to meet growing demand.

The man in the oil industry who is a bear on his own business—if such there be—will have his eyes opened if he will read and study the talks and addresses given by the big men of the oil business before the institute convention.

It was a serious meeting. No side-shows and no entertainment program had been provided. The men at the convention were there to discuss and consider a serious problem and that spirit prevailed to such a degree that practically the entire registration attended the various general sessions, afternoon and evening, while experts in the various branches of the business got together and

worked earnestly at the group meetings in the mornings on their particular phases of the big problem.

That the membership of the institute feels, after a little more than a year of operation, that the affairs and leadership of the organization are in competent and proper hands, is testified to by the fact that the entire personnel of officers and directors was re-elected for another year of service.

The meeting opened Wednesday morning with an address of welcome by President O'Donnell, and the group meetings got under way at once. At the first general session Wednesday afternoon, discussion of the subject, "The World Petroleum Problem," began with a paper by Walter C. Teagle, president of the Standard Oil Company of New Jersey, who took the sub-topic, "America."

Mr. Teagle declared that a continued adequate supply of oil for the United States as well as for the world, depends upon the maintaining of an open-door policy by foreign nations that will allow the genius, initiative and ability of the American oil man to have a share in the development of new fields all over the world.

He said that while some of the nations are now attempting to bar out Americans from a share in such development, he has no doubt that their policy will be changed when it is shown them that they are standing in their own light by so doing.

Mr. Teagle was followed by George Otis Smith, director of the United States Geological Survey, who talked on "A World View of the Oil Supply." Mr. Smith, describing and locating the known oil deposits of the world, went even further than Mr. Teagle, declaring that a pooling of the world's oil supply appears the best means of assuring that the world's need for refined products will be met.

A. C. Bedford, chairman of the board of directors of the Standard Oil Company of New Jersey, who was largely instrumental in founding the institute, who is in Europe, sent the following cablegram which was read by President O'Donnell, at the Wednesday afternoon general session:

"Greatly regret absence from institute meeting and extend cordial and sincere wishes for successful reunion and congratulations upon results already attained, which amply justify organizing of institute. Believe we are all of one mind that opportunity is immediately before us to greatly increase its usefulness and service."

At the evening session Wednesday, Richard Airey, vice president of the Roxana Petroleum Corporation of the Dutch-Shell group, discussed the world petroleum problem from the standpoint of Great Britain, disclaiming the charge that Britain's policy is to exclude outsiders from oil development, but asserting the empire is justified in giving preference to its own citizens. He stated that his remarks were not to be taken as authorized expressions of the British government.

Frederic R. Kellogg, general counsel for the Doheny interests and for the Association of American Producers in Mexico, had the sub-topic "Mexico," under the "World Petroleum Problem." He traced the history of American oil development in Mexico and the policy of persecution and confiscation followed by Carranza, and made a strong plea for the upholding of American rights abroad thru a government policy that made it plain that no infringements of the rights of its citizens would be permitted.

He also flayed that section of the American public that looks upon successful business as a menace and that loses no occasion to voice loudly but vaguely that "big business" is criminal and that wealth is a sin. He urged successful men to abandon the almost cringing position some of them have taken as a result of this abuse and stand firmly on their feet and fight back against such accusations.

The afternoon general session Thursday was given up to the topic "Production." R. D. Benson, president of the Tide Water Oil Company, discussed the sub-topic, "The Present." He stated the belief that the supply of crude can only be kept up to the required mark by the assurance to the producer, especially the wild-catter, of a fair price for his oil that will enable him to continue his operations at a profit.

The future of production was discussed by Thomas A. O'Donnell, president of the institute, at the Thursday afternoon session. He declared he has no misgivings about the crude supply of coming years, provided the producer is not hampered in his operations by unnecessary and harassing government restrictions and interference.

"The Future of the Oil Business" also was discussed at this session, by Henry L. Doherty, head of the Cities Service Company and Henry L. Doherty & Company. Mr. Doherty declared that increased confidence and increased investments on the part of the public are necessary to provide funds needed for the healthy development of the oil industry.

"Consumption," was taken up at the Thursday evening session, the subject being discussed by Charles F. Kettering, head of the research department of the General Motors Company, from the standpoint of the automotive industries and by Admiral W. S. Benson, chairman of the shipping board, from the standpoint of marine demand.

The general session Friday, which began at 9:30, was devoted to a report by General Secretary Welch on the work done by the institute during the year, and the afternoon session to a paper on "Conservation," by M. L. Requa, a short address by Senator Owen of Oklahoma, and a debate on Mexico, by Mr. Kellogg and R. V. Pesqueira.

Bureau Of Explosives Proposes Drastic Unloading Regulations

NEW YORK, Nov. 22.—An amendment to the present unloading regulations governing the handling of gasoline is to be drawn by the Bureau of Explosives of the American Railway Association, to give the roads the right to sell the contents of tank cars of gasoline which are not unloaded within 48 hours of the time they are offered by the railroad to the consignee.

This was decided upon at the recent annual meeting of the inspectors of the Bureau of Explosives, held last week in Chicago, according to Colonel B. W. Dunn, head of the bureau.

Oil company representatives were present at the meeting, as was also M. J. Gormley, head of the transportation division of the American Petroleum Institute, and J. M. O'Day, of the Sinclair Refining Company, representing the National Petroleum Association. After the oil companies had presented their side of the case Colonel Dunn agreed to submit the amendment to a conference of oil companies, before asking the Interstate Commerce Commission to put it into effect.

Inspectors of the explosives bureau declare a rule is necessary carrying a penalty for oil companies failing to handle tank cars of gasoline within the prescribed limit because of a comparatively few brokers lacking storage facilities who let cars of gasoline stand in railroad yards until they find a customer to take the stuff.

They point to the great danger of accidents from the escaping vapors from these tank cars, particularly in the summer. They say one broker has had ten cars of gasoline standing in the Kansas City yards since September 16. The Interstate Commerce Commission rule at present gives a 48 hour maximum, but there is no penalty for non-compliance.

The oil representatives at the inspectors' meeting, held November 14, 15 and 16, at the Congress Hotel, pointed out that the failure of the roads to make proper deliveries frequently made it impossible for the oil company consignee to unload tank cars promptly, that deliveries instead of coming at the rate of a few cars regularly, sometimes were bunched so that the oil company storage facilities would not handle the contents of all cars.

They also pointed out that the problem was chiefly one of railroad management rather than for the Bureau of Explosives to handle, and that the well managed roads seldom have tank cars undelivered on their tracks for more than the time allowed.

Further details of the institute meeting, with the addresses given, will be found beginning on page 41.

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The Institute—An Accomplishment

THE American Petroleum Institute is now an accomplishment rather than a promise. This was definitely established by the interest of the 400 registrants at its first annual convention in Washington last week. Whatever stamp of approval the institute needed to stimulate it to its future activities was given there.

There is no need to set forth here that the institute convention was the best the industry has ever held. That the oil trade in this country has reached a point where its leaders will gather together and in all seriousness discuss the needs of the business on the high plane of service to the public on which the conference at Washington was pitched, is cause for congratulation. It means the beginning of an era where the industry will co-operate to make the best possible disposition of the nation's resources of crude petroleum entrusted to its care.

The institute has accomplished much in the year and a half of its existence. But how much of what it has done can we in the industry take credit for? Reviewing its work of the past year its accomplishments are in practically every case the result of intensive effort of the institute's paid staff of secretaries and experts. This has been recognized by the re-election of the old directors and officers and the keeping in office of Secretary Welch and his assistants. But how many of the directors of the institute deserve their re-election? When a condition is reported by the secretary where councillors and directors in several districts fail even to send in their nominations for new directors to serve the coming year the officials in those districts cannot claim any particular share in putting the institute where it will bring the recognition and approbation of the industry expressed at Washington last week.

It will take more than funds and the valuable work of the secretary to make the institute all that it should be to the oil industry, or all that it can be towards co-ordinating the effort of the trade along necessary lines. More than the funds from oil companies the institute needs the active co-operation of its advisory boards and even its individual members.

It is not enough that the industry approve the work of the institute thus far and wish it more power the coming year. Those who have held back thus far because they were not certain what that body was going to be or what it was going to do certainly need not hesitate further on that ground. Those of us who have held back thru unwillingness to exert ourselves to greater activity or assume any new burdens ought to feel the stimulus of what the institute has already done in a year of pioneering.

The institute, the Washington conference shows, has the approval of the industry. Let us now give it the active support of the industry from directors down to individual members.

Let Institute Report Facts On Mexico

HAVING opened up at its Washington conference, the matter of the relation of American oil companies operating in Mexico to that country and its citizens, even tho that discussion produced more fireworks than was anticipated when the program was arranged; it seems to us the institute should not let that matter stand as at present on its record. It might well seize on the occasion as an opportunity to give the oil industry in this country the facts on the situation.

There are few in this country, certainly few in the oil business, who believe that the American companies fighting that Carranza doctrine of confiscation are doing any more than protect their rights. However, the choice of Attorney Kellogg for the Doheny interests by the institute to present the facts as to Mexico was perhaps unfortunate in that Mr. Kellogg was presenting a brief for his client and other American companies in Mexico. No matter how strong the case may be the court hears both sides. The representative for Mexico barely did more than advance bolshevistic doctrines and talk personalities.

What the situation needs more than anything else is an investigation and setting forth of the facts as regards conditions in the oil fields of Mexico by a disinterested party. Their facts and findings should be given the public to offset what is being printed in the yellow newspapers, passed out by certain agencies in Washington and peddled around the country by a group of alleged missionaries, whose expenses are being paid by interested parties in Mexico.

The oil companies operating there are obviously not the proper body to tell the facts regarding Mexico to the public because of their interest in the question. No Mexican can be trusted to return a true and unbiased report. While a statement by the institute would be discredited to some degree because it represented the oil interests in this country generally, that body is really the best-fitted agency to do this work. That report should go into the possibilities of future Mexican production as well as the political situation which made possible Article 27.

A report it made would be accepted by the oil industry in this country at any rate. It would give oil men the facts to refute false statements that appear from time to time. It might be a check on those newspapers which attack where there is little chance for them to be exposed. Unless the job is too much even for the institute, in view of the way the matter has been opened up, we believe it ought to be tackled.

Interstate Commerce Commission Decides It Can Nullify Intrastate Rates

By Special Correspondent

WASHINGTON, Nov. 22

ALL rates on petroleum and its products, made by state railroad and utility commissioners, were hit on the head by the Interstate Commerce Commission, November 17, when that body decided that it has the power to set aside state laws and state orders concerning rates if and when such rates make a material inroad on the revenues of the railroads so as to raise the question whether the state rates will not make it impossible for the railroads to obtain revenues enough to give them 6 per cent on the value of the property devoted by them to transportation.

When a state rate is knocked out, it means that the rate that takes its place will be higher than the displaced one. The decision herein referred to was made on a case drawing into question the lawfulness of the rate of 3 cents a mile for passengers from New York to Buffalo, over the route of the New York Central, which lies wholly within the state of New York, in comparison with a rate of 3.6 per mile over routes passing thru Pennsylvania and New Jersey.

California, Texas, Oklahoma, Kansas and every other oil producing state in the country has state-made rates on oil. It is only a question of time, unless congress or the supreme court prevents, when every one of them will fall thru an application of the principles laid down in the New York passenger fare case.

The railroads of the country have been fighting to be rid of state authority, in the matter of their regulation. On the plea of not being able to serve so many masters, they have fought for one master body in Washington to say what shall be the rate from Oakland to South Vallejo, for illustration, in California, or for Cleveland to Bedford, in Ohio. The distance between the Ohio points is a little greater than the distance between the California illustration. But the principle on which the case was decided is so clear-cut that, for instance, the California commission, if the decision is sustained, will not be authorized to prescribe the rate between the city proper and the port of Los Angeles, which on certain classes of freight is about 7 cents per 100 pounds.

The theory is that practically all state-made rates, being generally lower than rates for like distances on routes from one state to another, must necessarily constitute a discrimination against interstate commerce because the revenue resulting from them will not be enough, when added to the revenue from interstate rates, to give the railroads subject to the interstate commerce law, the 6 per cent return decreed in the Esch-Cummins law.

The Esch-Cummins law, according to the declarations made by the committees that reported it, did not intend that the Interstate Commerce Commission should go farther than it has heretofore gone in what is known as Shreveport case situations. The regulating body, however, construes it as authorizing it, on a showing that a railroad may not get 6 per cent, to strike down state rates that are not exactly the same as rates prescribed by the federal body, on like traffic for like distances on routes extending from one state to another.

Many of the state oil rates move large volumes of traffic. How much the decision will cost the oil companies, nobody can even guess. It may be a year or two before the case is fully disposed of, but if the federal regulating body is sustained, every one of the lower state-made rates will have to go up.

Breckenridge Situation Still Taut; Gulf Coastal Output Scaling Down

BULLETIN

TULSA, Nov. 23.—Prairie Pipe Line Company, which is taking some 18,000 barrels of oil out of Breckenridge district, is bending every effort to furnish relief to the producers in this district and expects to be in position to handle 27,000 barrels daily within the next week or 10 days.

Staff Special

HOUSTON, Nov. 21. — Congestion in the Breckenridge pool of the central black lime territory in central north Texas reached the stage of rapidly filling steel storage at the end of the week, which forecast that pipe line carriers could not hold out much longer in their efforts to handle flush production from the intensively drilled area. With trunk line capacity out of this territory only about 85,000 barrels plus sufficient pipe line room to handle the combined approximate production of 28,000 barrels daily coming from Ranger pool proper and Desdemona, it was apparent that as fast as steel storage in the field had been filled to a point approaching capacity takings of crude from Breckenridge producers would have to be reduced to the level where it could be handled in outgoing trunk line runs.

Only the Prairie Oil & Gas Company and the Humble Oil & Refining Company had remaining steel storage room other than normal working capacity in the black lime territory, and the combined total of roughly 2,000,000 barrels between these two interests made it certain that they were also fast approaching the point where only the depletion of wells already completed and the holding back of additional wells would allow for the handling of Breckenridge production.

Gulf Oil Corporation interests represented in the Gulf Production Company and the Gulf Pipe Line Company were unable at the end of the week to handle any more oil to field storage in the general Ranger territory.

They have an outgoing 8-inch pipe line from the Ranger territory to Fort Worth, where the carrier converges with a 6-inch pipe line from the Wichita Falls sand country area. Another 8-inch line from Fort Worth, which is fed by the Ranger and Wichita Falls lines, connects Fort Worth at Saltillo Junction with main Oklahoma-Kansas trunk line south of the Gulf.

Can't Run Maximum

Until the pumping station at Weatherford, between Ranger and Fort Worth, is completed in the next few weeks, it will be impossible for the Gulf interests to run from the black lime territory to Fort Worth the maximum of 20,000 barrels daily an 8-inch line is capable of handling.

The result is that the Gulf is finding it necessary to reduce its runs of outside oil from the Ranger territory, altho it is untrue that any effort is being made to cut off producers, as reported from north Texas. The Gulf interests will continue to handle all outside oil possible to put thru its lines over and above its own requirements, but with its steel storage filled to the last barrel it is unable to purchase and store crude in the field.

As a matter of fact, it has been possible for the Gulf interests to handle as much crude from the black lime country as it has done only thru deliveries recently to the Humble Pipe Line Company for common carrier transportation thru the latter's line to Texas City for delivery to the Vacuum Oil Company, on board coastwise tankers to the Atlantic seaboard. These deliveries totaled 600,000 barrels required at rate of 5,000 barrels daily before January 1, but which have been already completed.

How long the Humble and Prairie can hold out depends entirely upon their contracts, but it is certain, in the light of intensive operations at Breckenridge, the transitory nature of the highly flush black lime country production, and the recognized rapid depletion certain to result, that none of the principal purchasing agencies can be expected to build additional pipe lines nor even steel storage to take care of the oil brought in thru intensive operations that were repeatedly warned against.

In south Texas (Gulf Coastal saline dome territory), only Hull, West Columbia and Goose Creek stand out as principal producing areas, with Blue Ridge a haven for fresh operations that followed the completion of the latest Blakely wells of the Gulf Production Company on the northwest side of the dome and the Robinson well of The Texas Company on the west side of the dome.

West Columbia production, which was at its recent peak with the No. 1 Abrams and the No. 49 Hogg of The Texas Company making roughly 60 per cent of the then possible roundly 65,000 barrels daily total for the pool, was good on November 15 for a total of 44,685 barrels daily, of which total The Texas Company had 25,200 barrels, about maintaining its earlier ratio of total field production. Humble

At Hull, where the Humble Oil & Refining Company previously had about 1,100 barrels daily production, the completion of a new well on the Hankamer tract for 6,000 barrels, initial, brought up momentarily at least this company's daily production. Excluding the latest Humble Oil & Refining Company well, the production, November 15, totaled 17,550 barrels, of which total the Republic Production Company had to its credit 9,325 barrels; the Gulf Production Company 4,350 barrels, and the Empire Gas & Fuel Company 775 barrels, the remainder classing as small and miscellaneous whether owned by large or small operators. Gulf Coast Oil Com-

Last Minute News From Oil Fields

New Light Oil Area South Of Corsicana

Staff Special

HOUSTON, Nov. 22.—Humphreys Petroleum Company's No. 1 Rogers, within the limits of the old Mexia gas field, Limestone county, flowed over derrick once November 20, from a depth approximately 3,090 feet, opening up a new light oil producing area of Texas at a deep level. After making the first head drilling was stopped and well will not be completed until storage is on the ground to care for production. On account of the lack of gas at producing level and also because the test has not been fully drilled in, its exact value is unknown and any estimates are purely speculative.

This much is authentic, however, that results thus far have proved existence of deep oil probably coming from Woodbine sand formation at Mexia in Limestone county, about 30 miles south of shallower Corsicana sand production. Head of oil the test made resulted, November 20, since which time excitement has become widespread, principal operators getting on the ground immediately, as well as smaller interests and lease grabbers. Drilling operations on the test had been under way for a year when the flow resulted. The test which is within the limits of the shallow 700 to 900-foot gas production dating back to 1913, is between two and three miles southwest of the town of Mexia.

Earlier oil production in this territory, which lies east of the Balcones Fault line, had been from the upper part of the upper cretaceous geologic series which produced at maximum depths of 1,000 feet, the Corsicana field and smaller nearby pools being referred to in this regard. The Mexia-Grossbeck gas field did not become productive until 1913, since which time it has been an important fuel supply.

HOUSTON, Nov. 22.—Empire Gas & Fuel Company's well on lot 114 Chinampa, is the latest lower country of Mexico producer to make salt water. The well, which had been previously pinched down to 15,000 from 30,000 barrels, is now shut in entirely.

TULSA, Nov. 22.—At a special meeting, held here today, stockholders of the Harvey Crude Oil Company voted unanimously to move the headquarters of the company from Kansas City to Tulsa.

By Special Correspondent

TAMPICO, MEX., Nov. 22.—A direct steamship line connecting Boston with Tampico has been arranged. The first sailing will be from Boston about December 20, and continue thereafter twice a month.

J. G. Redshaw & Company, Boston, are agents for the line, which consists of freighters owned by A. G. Warren & Company, of Boston.

The line will draw from all New England ports with freight rates the same as those of New York and with cheaper

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By Special Correspondent

TAMPICO, MEX., Nov. 22.—The Island Oil & Transport Company is now pumping 48,000 barrels daily thru its pipe lines. By the first of the year they will be pumping on an average of 50,000 barrels daily.

The structural steel for the refinery has arrived and it is expected that the plant will be completed within a few months. An official of the company said that their oil exports for the month of November would be more than 1,500,000 barrels.

Four Companies Produce 50 Percent Texas Oil

Staff Special

HOUSTON, Nov. 20.—Four principal operators who produce more than half the oil recovered in the several Texas fields reported to the state comptroller for taxation purposes in the third quarter of the year the following barrelage taken out:

Company	Third Quarter Production	Nine Mos., 1920 Total
The Texas Company	3,574,933	9,209,754
Gulf Production Co.	2,156,331	6,489,546
Humble Oil & Refining Co.	1,687,126	5,484,319
Magnolia Petroleum Co.	1,326,296	3,931,520
Total	8,774,686	25,115,139

SHREVEPORT, LA., Nov. 19.—Upon petition of Paul E. Carter, United States Judge G. W. Jack of the western district of Louisiana has appointed S. A. Guy, of Shreveport, receiver for the Congress Oil Company. Yandell Boatner, of Shreveport, was appointed attorney for the receiver. Mr. Guy will take over the properties of the company at once, it is understood, and administer its affairs.

News Features Found In Production Section

A comprehensive discussion of the latest news of Oklahoma producing fields is found on pages 83 and 84 of this issue, including pipe line runs of the Okmulgee district and the Creek Nation producing area.

The Department of the Interior decision regarding Osage acreage limitations is of timely interest to producers. The effect of the decision and the present production of the Osage is given in detail beginning on page 86.

Mexican producers are holding down production of more wells as salt water continues to show. The latest significant developments in this respect are pointed out on page 85.

Indicates Opening Of Tucker Sand Pool

Staff Special

TULSA, Nov. 22.—The H. F. Wilcox Oil & Gas Company has a showing of oil on top of the Tucker sand found at 3,029 feet in its test in Sec. 31-16-8, near Depew, Creek county, which promises to open up a new field. Casing is being set preparatory to drilling in.

In Western Tulsa county, the Oklahoma Central Oil Company's No. 2 on the Quinn farm, in Sec. 27-19-10, in the Keystone pool, found the Red Fork sand at 1,978-1,008 feet and is making 300 barrels after a 120-quart shot. It is the best well in the pool and indicates a western trend to production.

Skelly Oil Company's No. 6 C. Hill, in the center of the north line of the northeast of the northeast of the northeast of Sec. 22-14-11, is a five-barrel well after a 15-quart shot in sand from 2,784-2,807 feet. The small caliber of this well marks the northeastern limit of the Phillipsville pool which has been characterized by large Wilcox sand producers.

In the Urschell pool, Marion county, Kansas, Leroy Adams and others' No. 1 Urschell, in the southwest of the northwest of the southeast of Sec. 16-21-5, is making 10 barrels of oil and 600 barrels of water one foot in the pay found at 2,339 feet. In the same section the National Refining Company's No. 1 Urschell, in the southwest of the southeast is cleaning out 700 feet of water and 1,600 feet of oil in the hole. Sand was found at 2,369 feet. No. 2 on this lease has apparently missed the pay, as it is shut down at 2,390 feet.

The American Petroleum Institute estimates that the daily average gross production of oil in the United States for the week ended November 13 was 1,307,045 barrels, as compared with 1,311,273 barrels for the week ended November 6.

The estimates by fields follow:

Daily Average Gross Production
(Figures in Barrels)

	Nov. 13	Nov. 6
Oklahoma	306,975	303,498
Kansas	104,500	102,300
North Texas	79,020	79,100
Central Texas	127,350	126,100
North Louisiana	83,750	89,900
Gulf coast	123,270	127,425
Eastern	125,000	125,000
Wyoming and Montana	52,180	52,950
California	305,000	305,000
Totals	1,307,045	1,311,273

HOUSTON, Nov. 22.—Stocks of Gulf Coastal crude oil on November 1 totaled 9,684,438 barrels, according to company figures obtained in Houston, comparing with 9,421,388 barrels October 1. The October 1 figures are lower by more than 1,000,000 barrels than the equivalent September 30 stock figures of the United States Geological Survey, which gave Gulf Coastal territory 10,719,000 barrels, and 10,612,000 barrels August 31.

Stockholders Show Scope of Widespread Oil Operations

Staff Special

HOUSTON, Nov. 19

STOCKHOLDERS of The Texas Company, who November 18 approved an increase in the capital stock from $130,000,000 to $143,000,000 for the purpose of declaring a 10 per cent stock dividend to stockholders of record, December 10, also voted to amend the by-laws changing the time of the annual meeting from November to the third Tuesday in March, thereby changing the fiscal year to conform with the calendar year.

All directors were re-named except Judge R. E. Brooks, of Houston, formerly president of the absorbed Producers Oil Company, who several months ago announced his forthcoming retirement. The directors at a subsequent meeting re-elected all officers serving in the prior administration of The Texas Company affairs.

The annual meeting followed a tour of inspection of the field and refinery properties of The Texas Company, which had been under way for about ten days. In this period principal producing fields of the Mid-Continent and southwest, where The Texas Company has properties, were inspected.

Officials and Directors Re-elected

Directors re-elected were: E. C. Lufkin, New York, chairman; L. H. Lapham, New York; C. P. Dodge, Houston; R. C. Holmes, New York; G. L. Noble, Houston; J. J. Mitchell, Chicago; A. B. Hepburn, New York; J. N. Hill, New York; Amos L. Beaty, New York; W. A. Thompson, Jr., New York; Edwin B. Parker, Houston and New York.

Officers re-elected at the directors meeting were as follows: E. C. Lufkin, chairman of the board of directors; Amos L. Beaty, president; T. J. Donoghue, first vice president, Houston; R. C. Holmes, vice president, New York; G. L. Noble, vice president, Houston; W. A. Thompson, Jr., vice president, New York; C. N. Scott, vice president, Houston; W. M. Capen, vice president, New York; Edwin B. Parker, general counsel, C. P. Dodge, secretary, W. W. Bruce, treasurer and assistant secretary, New York; Ernest Carroll, assistant to the first vice president, Houston; John P. Cook, assistant to Vice President Thompson, New York; Guy Stevens, assistant to general counsel, New York; Ira McFarland, comptroller, Houston; S. J. Paine, assistant secretary, Houston; W. G. McConkey, assistant secretary, New York; A. M. Donoghue, G. W. Foster, T. A. Spencer and H. D. Symms, assistant treasurers, Houston; D. B. Tobey, assistant treasurer, New York.

Oklahoma Properties Visited

Entering upon that part of their trip which centered in the producing fields of the Mid-Continent stockholders of The Texas Company visited the Beggs pool in Oklahoma, where in 1919 it developed the Mandy Coleman 80 acres in Sec. 34-15N-11E, this property being pointed out as one of the more recent valuable producing leases as The Texas Company has been an active factor in Oklahoma development for years. The first well on the Mandy Coleman lease was completed to the Wilcox sand in July, 1919, it was pointed out by J. H. Hill, assistant manager of the Oklahoma-Kansas producing division at Tulsa.

The production of this well was 500 barrels daily of 40 gravity oil. The production was later increased by deepening and shooting. Eight oil wells have been drilled. On October 1, 1920, according to Mr. Hill, the total production was 3,000 barrels daily and the total oil recovered from the lease has been 810,000 barrels.

In 1920, The Texas Company developed the Willie King lease of 80 acres. This lease is a mile south of the Mandy Coleman in Sec. 11-14N-11E. The first well was completed on May 25 with initial production, after being shot, of 2,400 barrels daily. Seven oil wells have been completed and the lease has produced more than 6,000 barrels of oil in a day. It may be mentioned in this connection that this is a condition indicating the greater recovery of oil possible from the more stable pools of Oklahoma as contrasted with the black lime territory of the Central Mineral Belt of Texas, where in the Ranger territory subsequent drilling never made it possible for lease production to reach a level higher than the flush output of the original well.

At the last stop in Oklahoma, the Hewitt pool of Carter county, which was discovered by The Texas Company, was visited. Here, in January, 1919, The Texas Company made a location in the northwest corner of Sec. 27, on the Denny farm, where the discovery well was drilled. Drilling was begun in February, and on June 1 oil was found at 2,070 feet. Drilling continued until June 5, at which time the well had reached a depth of 2,100 feet and was flowing at the rate of 500 barrels daily of 35-36 gravity oil. This well, it was pointed out by Mr. Hill, has produced 65,000 barrels of oil and is still producing at the rate of 45 barrels daily. Since that time The Texas Company has completed 18 wells with an average daily total production, October 1, last, of 2,500 barrels daily. The daily production of the Hewitt pool, as a whole, recently reached a level of 37,500 barrels.

Wichita Falls Development

After reviewing Electra development, dating back for years in the Greater Wichita Falls district of Texas, J. L. McMahon, general superintendent of the North Texas division, producing department, explained Burkburnett operations as follows:

"The Burkburnett pool is divided into three districts: the old Burkburnett pool, due west of Burkburnett; the Burkburnett townsite and the northwest extension.

"In the old field there were 991 wells drilled with an oil run of 11,509,623 barrels to October 14, 1920. Proven acreage, 7,500; the average production for this field per acre being 1,630 barrels, and the average sand thickness 18 feet.

"In the old Burkburnett field we have practically the same number of sands as in the Electra field and our data on Electra will hold good for the old Burkburnett field.

"In the townsite there have been drilled 822 wells with pipe line runs to October 14, 1920, of 14,069,307 barrels. Proven acreage, 1,500; average production per acre to October 14, 1920, 9,379 barrels. The top of the sand in the townsite averages 1,650 feet, and averages 25 feet in thickness.

"In the northwest extension there have been drilled 920 wells with a production of 25,917,228 barrels to October 14, 1920. Proven acreage approximately, 3,048 acres; average production per acre, 7,543 barrels to October 14, 1920. Average thickness of sand from 20 to 50 feet at a depth of 1,600 feet."

Stephens County Figures Given

H. M. Anderson, general superintendent, north central Texas division, producing department, at Cisco, provided the stockholders with an idea of black lime country development on their jaunt to Stephens county. The oil production of Stephens county is mostly from the first 100 feet in the lime, while the big production in Eastland county, in the vicinity of Ranger, was found in the top of the second streak of lime encountered around 3,500 feet.

"Up to the present time," said Mr. Anderson, "there have been drilled in Stephens county 851 oil wells and 35 gas wells. The 851 wells have produced a grand total of 24,675,814 barrels of oil as follows:

Year	Number Producing Wells	Total Prod. in Barrels
1916	1	2,794.13
1917	3	45,531.91
1918	20	742,496.43
1919	176	10,744,820.00
To 9-30-20	851	13,140,172.00
Grand Total		24,675,814.47

"At the present time," Mr. Anderson explained, "Stephens county is producing slightly over 110,000 barrels per day. The Texas Company has completed since 1916, 118 producing wells. The Texas Company has today 39 drilling wells and 24 locations. During the winter of 1919-1920 it had drilling in Stephens county about 90 wells."

In the Homer pool of Claiborne parish, under the jurisdiction of R. C. Stewart, general superintendent, Louisiana division, producing department, The Texas Company had not been a very extensive operator until a few weeks ago when its first Lewis well was completed to the shallow pay a location or two in advance of production at the southwest corner of the previously known producing structure of the pool, for about 2,000 barrels initial. Three producing wells on the Lewis lease, one to the deep pay good for 500 barrels daily, one in the shallow horizon making 900 barrels and another good for 50 barrels, were reported from Shreveport while the directors were visiting in Houston.

Figures on Homer pool operations as a whole were given the stockholders as follows:

Texas Company Stockholders Viewing Properties

Among those in this picture are—J. H. Hill, Tulsa, production superintendent; A. C. Hunter, New York City, secretary to C. N. Scott, vice president in charge of production; Albert Rockwell, Warren Pa.; G. L. Noble, manager fuel oil department, Houston; J. C. McCue, assistant manager all production, Houston; J. B. Duke, Houston, secretary to T. J. Donaghue, first vice president; R. C. Holmes, vice president in charge of refinery operations, New York City; J. L. Dowling, Houston, pipe line department; C. P. Dodge, Houston, general superintendent refineries; C. C. Hawkins; William Jervis, traffic department; H. M. Anderson, general superintendent Central North Texas producing territory, Cisco; A. B. Patterson, production department, Houston; M. Moran, pipe line superintendent, Tulsa; B. E. Hull; P. C. Scullen; H. Fowle; H. L. Thompson, Joliet, Ill.; T. J. Donaghue, first vice president, Houston; C. E. Herrmann; J. H. Lapham; Hugh Halzell; E. C. Lufkin, chairman of executive board, The Texas Company; Judge A. L. Beaty, president The Texas Company. To right J. J. Mitchell, president Illinois Trust & Savings Bank, Chicago; Travis Holland; W. H. Lynch, production superintendent, Gulf Coastal division, Houston; C. R. Wilson, general superintendent, producing department, Tulsa; M. W. Bahan, natural gas department, Fort Worth; Colonel John Lambert, Joliet, Ill.; William Wrigley, Jr., Chicago; Stephen Peabody, financier, New York City; Walter H. Wilson, of Wilson & Company, packers, Chicago; Colonel G. W. French, Davenport, Iowa; Ernest Carroll, Houston, treasury department; Judge R. E. Brooks, Houston, president of the previously absorbed Producers Oil Company; Judge Edwin B. Parker, legal department; Frank D. Stout; C. K. Longaker, Houston; L. K. Lapham, financier, New York City; Finley J. Shepard, New York; Orson C. Wells; Professor J. R. Jewitt, Boston; Chauncey Keep; W. D. Sewell, Bath, Maine; George G. Parker, Chicago; James Hopkins, president of the Diamond Match Company; Minor D. Crary, Warren, Pa.; Judge E. R. Spotts, Houston; J. L. McMahon, general superintendent, Wichita Falls producing division; Judge T. M. Taylor; T. J. McMahon; F. L. Bartlett, Olean, N. Y.; H. M. Byllesby, Chicago, public utility magnate and factor in Shaffer Oil & Refining Company; J. N. Hill, son of the "Empire Builder," James J. Hill; J. C. Hutchins, Jr.; William H. Mitchell; James A. Patten, Chicago train operator; W. H. Stanley, secretary to William Wrigley, Jr.; Philip Swift, son of Edward F. Swift, Chicago packer; W. A. Thompson, Jr.

Total Number Wells Drilled

Total shallow wells to September 30, 1920	412
Total deep wells to September 30, 1920	75
Total	487
Total production to September, 1920	20,206,194
Total producing acreage	2,300 acres
Acreage recovery per acre to date	8,800 bbls.
Now producing monthly	1,803,252

Visit Made to West Columbia

At West Columbia, Gulf Coastal Texas saline dome development of Brazoria county, where a picture of the visiting stockholders and officials was taken at the derrick on No. 4 Abrams, a drilling well, the two wonder wells of south Texas, are located. These are the No. 1 Abrams, which found the pay a quarter of a mile northwest of the earlier 100-acre West Columbia pool, and which produced 1,100,000 barrels of crude oil worth $3 a barrel in 46 days, dating from July 20, last, before sanding up; coming back for about 9,000 barrels, and flowing steadily an average in excess of 7,000 barrels daily until about a week ago, when it began making a small percentage of salt water and b. s. It's offsetting No. 49 Hogg, which recently came in for 27,850 barrels initial and attained a maximum production of nearly 33,000 barrels, was also visited, this well in the last week also showing some salt water and b. s.

It was pointed out in this connection, however, that the value of oil produced from No. 1 Abrams alone was equal almost to the equivalent of 5 per cent on the total capitalization of The Texas Company and, of course, the No. 49 Hogg in the first day's flow more than paid for all investment that had been ever made on it.

Other operating statistics, showing monthly gross production all divisions for the year 1919 and the first nine months of 1920, were given, as follows:

Month	1918	Dly. Avg. 1918	1919	Dly. Avg. 1919	1920	Dly. Avg 1920
January	1,150,131	37,101	1,214,695	39,184	1,402,097	45,261
February	1,148,550	41,019	1,259,406	43,925	1,365,255	47,077
March	1,199,427	38,691	1,278,551	41,243	1,649,391	53,206
April	1,191,756	39,728	1,284,581	42,819	1,522,271	50,742
May	1,299,278	41,912	1,388,511	44,790	1,672,791	54,090
June	1,199,062	39,969	1,448,779	48,292	1,636,119	54,537
July	1,253,617	40,439	1,511,149	48,747	1,936,065	62,453
August	1,216,418	39,230	1,511,675	48,763	2,458,225	79,297
September	1,287,993	42,933	1,549,661	51,655	1,950,855	65,028
October	1,239,216	39,975	1,662,574	53,631		
November	1,191,434	39,714	1,572,934	52,431		
December	1,204,302	38,848	1,495,020	48,226		
Total	14,581,190		17,177,536		15,593,069	
Monthly Average	1,215,099		1,431,461		1,732,563	
Avg. per Day	39,948		47,062		56,909	

Note: This does not include Mexico.

Completion for the Twelve Months Ending September 30, 1920

Division	Oil	Gas
South Texas	46	1
North Texas	85	1
North Central Texas	114	4
Louisiana	25	7
Oklahoma and Kansas	108	15
Wyoming	0	0
Grand total	378	28

Lease and Fee Holdings as of September 30, 1920

Division	Lease Acreage	Fee Acreage
North Texas	370,970	3,982
North Central Texas	451,193	6,095
South Texas	382,059	80,970
Texas Counties in La. Div.	144,650	11,788
Louisiana	368,035	186,439
Oklahoma	464,275	3,883
Kansas	37,530	80
Wyoming	12,023	.....
Kentucky	33,048	.....
Arkansas	4,211	.....
Other States (4)	1,870	.....
Total	2,280,139	293,237

Note: A considerable number of these holdings are already productive, while others are within what is considered the proven zone.

Natural Gas Gasoline Plants

In a consideration of its properties as a whole it was developed for the information of stockholders that The Texas Company, producing department, operates 21 casinghead plants, located as

follows:

	Plants	Daily Capacity cu. ft. gas	Daily Production gasoline, gals., manufactured and saved
Electra, Texas	1	2,500,000	6,000
Burkburnett, Texas	1	700,000	4,000
Caddo, La.	3	500,000	2,150
Number Texas Dist. temporary plants	2	450,000	420
Naborton, La.	3	450,000	1,200
Keifer, Okla.	2	1,600,000	13,000
Cushing, Okla.	3	2,800,000	9,000
Lost City, Okla.	1	83,000	150
Bald Hill, Okla.	1	830,000	2,600
Big Heart, Okla.	1	700,000	1,000
Preston, Okla.	1	166,000	1,800
Quay, Okla.	1	500,000	700
Cleveland, Okla.	1	265,000	730
Grand Total		11,544,000	42,750
Under Construction			
Breckenridge, Texas.	1	10,000,000	

On a visit to the Port Arthur and Port Neches refineries the stockholders were told that the combined rated capacity of the company's refining and topping plants in the United States is 90,000 barrels of crude oil per day. In addition, the topping plants of the Mexican Company at Tampico and Agua Dulce have a capacity of 17,000 barrels of crude oil per day.

In 1919 The Texas Company refineries ran 28,600,000 barrels of crude, an increase of 22 per cent above the 1918 figures; in 1919 the refining department produced 6,000,000 barrels of gasoline. This output was an increase of 17.84 per cent over the 1918 figures, compared with an increase in the total United States production of 10.85 per cent.

In 1919 the refining department produced 2,976,308 barrels of kerosene.

In the same year The Texas Company refineries produced 869,106 barrels of lubricating oils.

In 1919 the Texas Company asphalt plants produced more than one-sixth of the total asphalt of the United States. Port Neches refinery includes the largest plant in the world for the manufacture of asphalt from petroleum.

In 1919 the can factory at Port Arthur fabricated 8,251,033 five-gallon cans and 4,745,968 cans of other sizes, a total for the year of 12,997,001 cans.

In the same period the case and package factory manufactured 4,055,062 ten-gallon cases, utilizing over 30,000,000 board feet of lumber.

The inbound and outbound tonnage of petroleum products by rail and water at The Texas Company refineries and terminals during 1919 amounted to 7,901,020 tons.

The crude runs at Port Neches average about 450,000 barrels a month, but as asphalt and roofing are the only products finished at this plant, the distillates are piped to Port Arthur, a short distance away, for refining. At Port Arthur, there are 228 stills of various kinds and capacity in operation, with 44 buildings. The crude runs average about 1,000,000 barrels a month, in addition to about 600,000 barrels of distillates coming in from Port Neches, Dallas, West Tulsa, Ardis and Mexico and from the terminal topping plants for re-running and finishing. The plant is now producing monthly about 350,000 barrels of gasoline, 200,000 barrels of kerosene, 600,000 barrels of fuel oil, 125,000 barrels of lubricating oils, 500 tons of wax, 2,000 tons of coke and 1,500,000 pounds of grease, in addition to black oils, gas oils and other products.

Believe President-Elect Has Correct Perspective On Mexican Oil Question

By Special Correspondent

WASHINGTON, Nov. 20.—America's eyes, so long turned toward Europe will be cast toward affairs much nearer home as soon as Warren Gamaliel Harding becomes president of the United States. It is almost as certain that Mr. Harding will take up the Mexican matter immediately after he is in office as it is that two and two make four.

As a matter of fact it may be truthfully said that he is considering now and has been ever since he went to Texas for his vacation, if gathering facts and impressions can be called consideration. He has gone as far as, in his capacity as a private citizen, the laws of his country permit him to go.

The State Department on November 17 took indirect cognizance of what has been going on on the Rio Grande and "authoritatively announced" that no corporation, or group of corporations, and no group of individuals is going "to deliver American recognition to Mexico." That was regarded as a peevish little fling at the suggestion that if Harding called on Obregon, even for a minute at Vera Cruz, that calling would constitute a recognition of the present regime in Mexico. Such a call would not be a recognition, altho it might lead to such an understanding between the prospective presidents of the two republics that a much better state of feeling would follow immediately.

There are men in Washington who think they know Harding's mental habits so well that they forecast an understanding between him and Obregon that will result in Mexico abandoning her scheme for the nationalization of oil and other minerals—at the expense of the men who think they have the fee simple title. Before the formality of Obregon's election he went so far as to have his agent in Washington give out a statement in which the Mexican president-elect said that no matter what the Mexican supreme court might decide in respect to Article 27, it would not be applied retroactively; that is to say it would not be applied to lands, title to which passed prior to the effective date of the article.

There is a feeling that Harding will ask for nothing from Mexico other than an observance of the ordinary rules for honest behavior, and those who know Obregon say he is of the type that scorns the camouflage under which attacks upon private property have been staged in this country during the last fifteen years.

The state department has received letters and memoranda from many Americans having interests in Mexico. According to the insinuations of the department officials the Americans who have expressed their views are to be considered hardly respectable for intimating that it is the duty of the American government to make it plain to Mexico that the property interests and the lives of Americans in Mexico must be protected in accordance with the American principle that an ex post facto law or constitution is abhorrent to decent men, and one to which Americans would not submit, even if Mexicans of property felt constrained to be silent while they were being robbed, as the better policy.

According to dispatches from the Rio Grande country, emanating from men who have been to see Harding, the sentiment of Americans on the border is against military intervention in Mexico, as unnecessary if it be made plain to all factions of Mexicans that there will be no interference in their domestic affairs so long as Americans are not deprived of the property about the title to which there was no question prior to the enactment of the nationalization part of the constitution, the constitutionality of which the Mexican supreme court is considering now.

Jake Hamon, Oil Man Of Oklahoma, Is Shot

Staff Special

TULSA, Nov. 22.—Jake L. Hamon, millionaire oil man and Republican national committeeman from Oklahoma, who lies seriously wounded in an Ardmore hotel, was injured by the accidental discharge of his revolver, according to Frank L. Ketch, Hamon's business manager. However, Russell Brown, county attorney, of Carter county, in which Ardmore is located, has sworn out a warrant charging a woman said to be from Ringling, Oklahoma, with assault with intent to kill in connection with the shooting of Hamon Sunday night.

Following the shooting an operation was performed removing a twenty-five caliber automatic bullet which had penetrated the liver. Physicians believe he will recover unless complications develop.

Oil Well Depletion Income Tax Offset

Based on an opinion rendered by Acting Attorney-General Frierson, the Commissioner of Internal Revenue has rendered an income tax decision to the effect that the deduction for depletion in the case of mines, oil and gas wells, as the result of discovery on or after March 1, 1913, is allowed only to the party or parties in possession at the time of the discovery, and not to subsequent purchasers.

Mr. Frierson also holds that the value may be set upon the case of the discovery of mines, oil and gas wells, pursuant to the second proviso of Section 234 (a) (9), Revenue Act of 1918, to be depleted in accordance with such reasonable rules and regulations as the Commissioner of Internal Revenue and the Secretary of the Treasury may prescribe according to the peculiar conditions in each case, is, in the case of a lease, to be equitably apportioned between the lessor and the lessee.

Light and Heavy Duty Whites owned by The Johnson Oil Refining Company, of Chicago Heights, Ill.

Johnson Oil Refining Company Standardizes on Whites

FOUR years ago, The Johnson Oil Refining Company, of Chicago Heights, Ill., purchased trucks of six different makes, including a White, for purposes of comparison, and to determine which make of truck should be standardized on. A year ago, on the strength of the White's showing, eleven Whites were placed in service. Additional units are now on order.

"We decided to standardize on White Trucks for the reason that records which we kept convinced us that the White is best suited, most dependable and most economical for our service," says Mr. I. H. Johnson, secretary.

A new 50-page illustrated booklet, "White Trucks in the Oil Industry," tells why the largest oil companies—producers, refiners and distributors—are using White Trucks and why they increase their investment in White equipment year after year. It tells why Whites predominate in every branch of the industry. A copy of this booklet will be sent to anyone interested, upon request.

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Prairie Pipe Line Company Orders Material For 500 Miles New Lines

By H. L. Wood

PITTSBURGH, PA., Nov. 20

ORDERS have been placed with pipe mills and deliveries are starting for 500 miles of 8 and 12-inch loops and auxiliary trunk line by the Prairie Pipe Line Company from its Mid-Continent initial stations, the approximate cost totaling $12,000,000. The new work is on the trunk lines to Wood River, Ill., above St. Louis, and to Griffith, Ind., eastern terminals of the Prairie lines. The loops will add 25,000 barrels to the capacity of the trunk lines and enable the movement of 165,000 barrels of Mid-Continent crude to eastern delivery points every 24 hours. Orders have also been placed for additional pump-station equipment to supply the increased pipe line capacity. Work will start within a week and be rushed to completion.

The Prairie Pipe Line Company is the greatest transporter of crude oil in the world and the added capacity merely strengthens its position. Crude oil is taken from wells thru gathering lines in Oklahoma, Kansas and north Texas to the trunk lines, supplying refineries at Neodesha, Kan., Sugar Creek (near Kansas City, Mo.), and delivered to a refinery at Wood River, Ill., and from Griffith to the Whiting, Ind., refinery of the Standard Oil Company of Indiana. A branch line to Sarnia, Canada, crossing the boundary near Detroit, delivers crude to the lines of the Imperial Company, Ltd. The Illinois Pipe Line Company receives crude oil from the Prairie company's terminals and delivers it to other lines that transport it to Bayonne and Bayway, N. J. with deliveries also to Pennsylvania refineries.

The Prairie Pipe Line Company was organized in February, 1915, to take over and operate as exclusive transporters of crude oil all the lines of the Prairie Oil & Gas Company, at an upset valuation of $27,000,000, the authorized capital of the Prairie Pipe Line Company, shares par at $100. Many additional trunk lines have been added to those taken over from the two lines to Wood River, Ill., and two lines to Ranger, Tex. One of the Ranger lines was taken up because of a failure to obtain sufficient crude. However, an increasing demand for crude by eastern refineries has forced continual additions to trunk line capacity east. The Prairie Pipe Line Company transports approximately 55,000,000 barrels of Mid-Continent crude annually, providing a revenue that enables the payment of attractive dividends, for many months 5 per cent regular and 5 per cent extra quarterly. In recent months, because of heavy expenditures for new lines, the dividend payments have been slightly less. Latest quotation for Prairie Pipe Line shares is $205.

William F. Gates has been president of the company since its organization, with George Coyle vice president and general superintendent. From the organization of the Prairie Oil & Gas Company, with a capital of $1,000,000, in 1899, Mr. Gates was a vice president and general manager until J. E. O'Neil became first vice president and later president, in 1904. Increasing pipe line work caused Mr. Gates to devote all his time to it, Nelson K. Moody becoming vice president and production manager for the Prairie Oil & Gas Company, Independence, Kan., being headquarters for both companies.

The great strain put upon major producing, refining and transporting petroleum companies during the war consolidated a great deal of work in New York, and J. E. O'Neil became a member of the executive board of the Standard Oil Company of New Jersey, daily meetings of the board necessitating his residence in New York. Beginning work at Titusville as a roustabout when a boy, Mr. O'Neil gradually worked west to Ohio and Indiana and became a gauger, district foreman and production superintendent for the Ohio Oil Company, under J. C. Donnell, its president. A fine physical presence, personality and capacity for unlimited work landed Mr. O'Neil where those qualities quite uniformly land all men, and he is now one of the big and capable men of Standard Oil, and in his prime. He was an active member of the National Petroleum War Committee and is a director of the American Petroleum Institute.

I know of no pipe line executive who has a wider grasp of crude oil transportation than W. F. Gates, nor a man who is in closer touch with the details of operation and gets thru each day's work with less fuss and more satisfactory results, and there are many very competent pipe line men in the United States and Mexico. He has a splendid and efficient corps of assistants.

WASHINGTON, Nov. 19.—Changing gear to speed up a little, and dropping into a detail of another very efficient organization—The Texas Company—David F. Connolly gave me a hint of an angle of the oil business that indicates modern trends, both industrial and political. As manager of the Wolverine Oil Company, Mr. Connolly has to deal with tax problems that involve complexities, as do most modern managers. The Wolverine Oil Company operates a number of casinghead gasoline plants. Transportation of this volatile and somewhat dangerous product requires many safety devices and their careful manipulation.

Casinghead gasoline is so volatile that slight agitation creates gas that has tremendous expansion. Experience has caused the use of pipes in tank cars thru which the gasoline passes from the loading-hose from the stock tanks to the car dome. These pipes are laid down along the bottom of the car tank so the fluid flows without force enough to throw off gas, with safety valves to absorb the gas before it can expand and either escape into the air or cause internal explosions. The first shipments of casinghead gasoline in common tank cars allowed a tremendous waste of the gasoline, which had a gravity of 80 degrees and above, the loss

being as much as 40 per cent at times. Improved equipment and care have reduced losses to about 10 per cent, the best operators say, with a considerably lower gravity as compression has been improved.

The political angle of the casinghead gasoline problem leads out from revenue departments of government that deal with taxes. Washington authorities have insisted that the casinghead gasoline industry's profits for taxation, if maintained or increased, might be the result of suppressed disclosure of source rather than from more efficient operation. A great mass of details have been threshed over because of government's desire to discover new or camouflaged sources of profit to operators. Some government men have seemed to have the attitude that when operators maintain profits in the face of high taxes, mounting costs of materials, labor and transportation there must be something wrong, or at least suspicious, and a discovery must be made that may be called statesmanship and watchdog ability.

Almost continuous hearings have pretty well demonstrated that the average industrial operator has been compelled by dire necessity to reduce operation to mathematical exactness if legitimate profits are to be maintained. Conservation enthusiasts, it seems fairly evident, chase more money into government tills than they chase waste and inefficiency out of industrial operation. Real conservation is maintained by the practical owners and managers of production and manufacture—at least those who maintain consistent profits.

In casinghead gasoline operations there is a gradual shrinkage of the volume of gas from producing leases, altho the gas may increase in richness as the volume shrinks. The gas contracted for a period of years has less volume at the end of the period than at the beginning, and this steady shrinkage must be replaced if the plant is maintained at original capacity. This means that a greater area must be covered to obtain more gas, and in many sections the gas is so closely contracted for that no new territory within profitable distance remains. Small oil refineries have the same handicap. Government agents seeking sources of increased tax collections, generally knowing little and caring less about the troubles of taxpayers who maintain the heavy and growing expenditures by government, do not easily relinquish any dependable source of taxation. This attitude of government frequently makes it embarrassing for the honest operator who is trying to explain the itemized sources of his income, having to appear as defendant rather than as plaintiff at some stage of the proceedings.

Many individuals and corporations employ lawyers to transact their business with government bureaus and departments, thinking, apparently, that lawyers can better present the technicalities and details of industrial operations. The most successful business managers seem to agree that when lawyers appear before government departments to plead the cause of business, government agents become suspicious, or at least freeze up, and the result is not altogether satisfactory. The natural conception of lawyers easily visualizes a court-room and an attempt

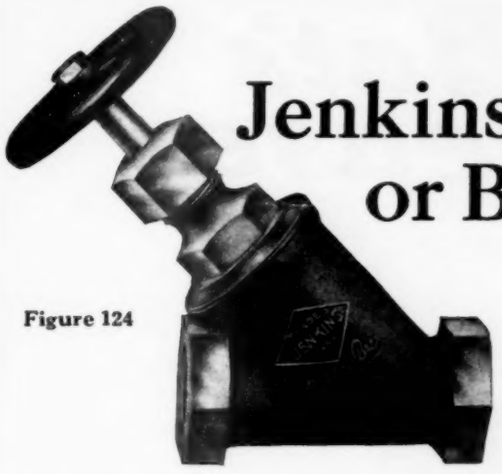

Figure 124

Jenkins Brass Y or Blow-off Valves

(Standard Pattern)

For 150 pounds working steam pressure; 250 pounds working water pressure. Fitted with Jenkins discs and renewable seat rings. Have full openings nearly in line with the pipe. Particularly adapted for boiler blow-off service, also extensively used where thick fluids are handled. Screwed or flanged types.

Genuine Jenkins Valves are known by the name and Jenkins Diamond Mark —at supply houses everywhere.

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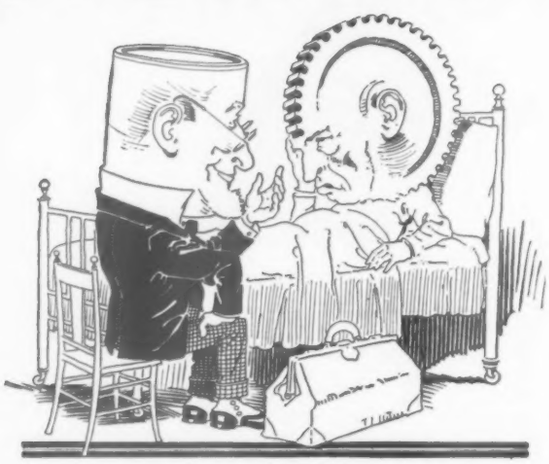

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to turn aside or minimize some possible penalty following failure to observe lawful requirements, and this conception runs as true to form in government departments as it does in private circles. Being such a natural apprehension we may wonder that so many persons deliberately pose in the position.

The owner or manager of any business is ordinarily better prepared to present the legitimate details of the business than is a lawyer trained in other lines. It is not specious or unwarranted to assume that the education of a lawyer involves an understanding of technical procedure to strengthen natural ability to discredit the other fellow's argument or claim. The lawyer's attitude is therefore more professional than practical at times and brings into play the desire or purpose of government to discredit the lawyer. I have been assured by most government men that they really like to meet the straightforward business man and help him perform the double-barreled feat of meeting lawful requirements and protecting his own lawful rights.

Tulsa Geologists Form Association

TULSA, Nov. 18.—At a meeting held here last Wednesday night, the Tulsa Geological Society was organized, the object of which is to increase the diffusion of geological knowledge and the promotion of good fellowship and cooperation among geologists, petroleum engineers, and men interested in the technical problems of oil production.

The following officers were elected to serve during the coming year: E. G. Woodruff, chief geologist of the Oklahoma Producing & Refining Corporation of America, president; J. Gardner, consulting geologist and producer, vice president; Richard Hughes, head of sub-surface department, Cosden & Company, secretary; F. C. Green, consulting geologist, treasurer. The consulting and administrative committee consists of John A. Udden, chief of geological department of Sinclair Oil & Gas Company; Luther White, chief geologist, Oklahoma Central Oil Company, and Sidney Powers, of the Amarada Petroleum Company (Lord Cowdray interests).

Luther White, of the Oklahoma Central Oil Company, discussed the sub-surface sand relations in northeastern Creek, western Tulsa and southeastern Osage counties, showing by a cross section map the correlation of the 300-foot break in the Mississippi lime with the Wilcox sand producing horizon of southern Okmulgee county.

F. C. Green, formerly of the Geological Survey, who spent several years conducting an exhaustive study of subsurface conditions in Missouri, read a paper discussing the out-cropping of lower Permian, Mississippi, Devonian and Ordovician near Joplin, Missouri and Ozark region, in their relation to deep formations as recorded in well records in general vicinity of Tulsa.

Meetings of the Tulsa Geological Society will be held semi-monthly on the first and third Fridays of each month, the place of meeting to be designated by the president or by agreement among the members.

Importance of Increasing Production Dwarfs All Other Problems

By Walter C. Teagle

President, Standard Oil Company of New Jersey

IF the matter of ample petroluem supplies is not the world problem today, it must at least be included among the few really big questions on which thinking men the world over are spending a good deal of energy.

As chairman of the committee on foreign relations of the American Petroleum Institute, I know that the members of that committee have devoted a good deal of study to this question, and I purpose now to present their view on the situation.

The world's petroleum situation as it exists today is this:

The demand is keeping pace with production and bears every promise of expanding in future as rapidly as more crude can be supplied. The average increase in the world consumption in the past decade has run about 11 per cent per annum. No matter what prodigious labors the producers perform, the world still clamors for more oil to meet its insatiable hunger.

Who would have ventured to predict just a few years back that the United States alone could absorb, in addition to its own greatly augmented production, 120,000,000 barrels of petroleum in a single year from an outside source of supply? Yet, that is what it has done this year, and the refiners can take a larger quantity from Mexico in 1921 without injuring the market for the higher grade domestic production.

No more striking indication of the growth of demand could be desired than the manner in which this huge output from Mexico has been swallowed up, largely in a new market, without disturbing in the slightest degree conditions in the older producing fields here. It is a conservative estimate that the world consumption, which in 1910 was 327,000,000 barrels, and this year 615,000,000 barrels, will call for close to 700,000,000 barrels in 1921. Where and how is this production to be obtained?

Let us look at the situation in the United States. This has always been the great petroleum producing and consuming nation, supplying close to two-thirds of the total world production. Up to 1916 the yield of domestic crude was sufficient to run the refineries. Since that time the gap between domestic production and consumption has steadily widened.

Domestic production is holding up remarkably well. Nevertheless, in 1919 the United States imported nearly 6,000,000 barrels of crude oil. When the current year's figures are complete, they will probably show imports of nearly 12,000,000 barrels. Indications are that in the current year we shall produce within our own borders 445,000,000 barrels and consume, with Mexican imports, a total of 565,000,000 barrels.

The figures matter little, but the tendency is all important. It emphasizes the relatively smaller part our home production is going to play in the future. Our British friends, in endeavoring to explain the position their government has taken since the armistice, have argued that, as the United States is now supplying 70 per cent of the world's current production, we should be well content with things as they are. This is an entirely fallacious view. They should restate their deduction in this way: The United States is now spending its petroleum wealth for the world's benefit, in order to meet 70 per cent of the world's present demand.

Americans have done this primarily because they had the most accessible oil and the facilities for refining and distributing it. Is it reasonable, however, to ask that they go heedlessly on to the quick exhaustion of their supply, and then retire from the oil business?

The American petroleum industry cannot accept such a conclusion. On the contrary, it must look to the development of production outside the United States to supplement the supply from domesic fields. Domestic crude is not sufficient even for current home needs, and it is absolutely imperative that American petroleum producers proceed actively and intelligently to develop oil resources in foreign lands. They are particularly fitted by past experience and training for this work.

We cannot close our eyes to a portent of obstruction that looms in the way. In the United States there has been from the beginning an open field for the citizens and the capital of all nations, without discrimination. But, when we turn our eyes abroad, we see today certain governments, their realization of the importance of petroleum quickened by the war, but without experience in conduct and management of the industry in time of peace not only essaying to enter the oil business themselves, but also directly to engross the sources of supply and to reserve the developments of such sources to their own citizens, companies and capital.

What we are now obliged to consider is the fact that, by the policy of governmental control and restriction, the oil industry has been injected into international politics, where, as occasional revelations during the past year compel us to believe, the rule of open covenants openly arrived at has fallen into a state of deplorable neglect.

With the necessity for carrying on a vigorous campaign wherever oil may be found, the world is confronted with the question of the best way to obtain and operate new sources of supply.

America And The Petroleum Problem

Highlights From Mr. Teagle's Address

THE petroleum problem is essentially that of increased production. The world could profitably and economically make use of a larger supply. Other questions in our industry are of little moment when set against this fundamental problem of increasing production at home and abroad.

¶The needs of America are the greatest of any nation, the per capita consumption of oil in this country being 220 gallons a year as against an average of fourteen gallons annually per capita for the world, including the United States.

¶Many foreign governments are deliberately placing obstacles in the way of those who would like to assist in the development of new sources of supply. If they persist in this while relying on the United States for the supply of a large part of their present needs, this country will have to consider retaliatory measures.

¶We shall not get any considerable addition to our supply of crude thru attempts by governments either to put limitations upon foreign companies or themselves to enter the list of operators.

Should this work be done by governments with government ownership and restrictive legislation, or should it be entrusted to the private producers and practical oil men of the world, to be pushed by them without governmental hindrance other than such regulation as is applied to industries in general?

Let us consider the first alternative. Is there any justification in this country, based on the experience of our own government in running the railroads and express companies, in building and running ships, or in any other particular in which government has entered the domain of business for believing that there is in government operation any of those qualities necessary for the development of great business with boldness, initiative or efficiency?

In Other Countries

How is it abroad? The French have been in the oil business by reason of the war, handling petroleum imports and subsequent distribution thru a consortium. As a result their distributing facilities are years behind the times and their supplies have been acquired at considerable excess cost over the markets of the world.

In England, nationalization of resources has appealed especially to the trade unions, and the British policy of engaging in production has been in keeping with this tendency. But with the government deeply involved in that enterprise, the British public is beginning to ask why it has not benefited thru any lowering of prices, now that it is a copartner with the government in the oil business.

In no other country has a government gone so wholehearted into the nationalization of its oil lands, however, as in Russia. Under private management, the oil fields of Russia produced in 1915, 69,000,000 barrels. In 1918 they yielded 40,000,000 barrels, and in 1919, 34,000,000. Under soviet control, commerce has almost stopped for lack of lubricants and the people are doing without light and warmth because their supplies of petroleum have failed them.

The Record of Performance

Now what is offered by the industry itself in the way of a promise of bigger production if it is left unhampered?

The record of performance is clear. For half a century the oil business, privately conducted, has attracted to its service ample capital, and men of brains, strength and resourcefulness.

In the United States, where the industry had the freest rein, it has traveled with seven-league strides. In no other country in the world have petroleum products been so uniformly good in character, so liberally provided, or so reasonable in price.

The per capita consumption here per annum of petroleum has been 220 gallons, as against an average of 14 gallons per capita for the whole world, including the United States. The oil industry here has been ever active, constantly alert to find new sources of supply, to develop better and more economical methods of transportation and refining, and to discover new uses for all of the various products. This country's oil lands have been thrown open to the world, with aliens as free to acquire production as our own citizens. It is a fact that the largest foreign oil corporation operating in this country shows in its report for the year 1919 that 47 per cent of its total production came from the oil fields of the United States.

On the other hand, many foreign governments are deliberately placing obstacles in the way of those who would like to assist in the development of new sources of supply.

You are all generally familiar with the terms of the San Remo agreement, proposing a division of Mesopotamian and other Near East territory between the British and French, and the tripartite agreement recently entered into by Great Britain, France and Italy, defining the spheres of influence in Turkey which is susceptible of diplomatic inquiry as to its true meaning.

One of the articles of the agreement provided "against any prejudice to the rights of nationals of the non-signatory powers to the treaty to free access to the various areas for commercial and economic purposes." Another article in this same agreement appears to nullify the principles of the open-door policy for it is "subject to the reservations contained in the treaty of peace with Turkey, or which have been voluntarily accepted for themselves in the present agreement by the contracting powers."

You know that Persia is almost entirely limited to the development work of one English company, that a Dutch company enjoys almost a complete monopoly in the Dutch East Indies, that Japan restricts development of petroleum properties to her citizens. The French provided by the act of September 9, 1919, for complete nationalization of all mineral resources.

The petroleum question constitutes one of the most acute factors in the Mexican problem. There, as in the United States and most other countries, the law has from time immemorial vested in the owner of the surface and his assigns the right freely to exploit the oil deposits underlying his land.

With this principle established and, furthermore, confirmed by legislation in the years 1884-1909, Americans and other foreigners went into Mexico and invested hundreds of millions of dollars in the purchase of lands and oil leases and the location and development of petroleum resources. Then, in 1917, by the simple expedient of the adoption of a new constitution, the Carranza government undertook to divest all private owners of these subsoil rights and to place in the Mexican nation the complete ownership and control thereof, without pretense of compensation.

To this list could be added many more countries or possessions under foreign control where restrictions retard the development of petroleum resources by their own nationals or by aliens.

An Alternative

If foreign governments insist on pursuing the policy of nationalizing oil lands, and reserving sub-soil rights to be held under government direction; if they persist in attempting to keep all of their own petroleum deposits for their own future benefit, while relying upon the United States for a large share of their present needs, then, and in that event, this nation will have no alternative but to take cognizance of the attitude of foreign governments, and, as a matter of necessary self-protection, to consider the adoption of measures reciprocally to conserve its petroleum resources for its own people.

It is to be hoped that the United States will never be forced to take such a step by way of self-defense. This country has always acted on the principle that petroleum, being one of the world's vital necessities, should be produced under such restrictions only as are essential to conserving the public's rights, these restrictions being applicable to citizens and to aliens alike.

And, as the United States, altho having most at stake in the matter, has thus freely admitted the citizens of other countries to the advantages of its production, it is justified in asking now that its people be admitted to the development of the petroleum resources of other countries on the same terms as their citizens have been welcomed here.

To summarize the situation, the foreign relations committee feels that the petroleum problem is essentially that of increased production. The world could profitably and economically make use of a larger supply. Other questions in our industry are of little moment when set against this fundamental problem of increasing production at home and abroad.

World-Wide View Needed

It is a challenge that must be met and I am enough of an optimist to believe that no people will be for long so foolish as to stand in their own light by adhering to selfish restrictions which operate to limit the development of new territories. The question is bigger than national boundaries, and we must all of us take a world-wide view of it.

We shall not get any considerable addition to our supply of crude thru attempts by governments either to put limitations upon foreign companies or themselves to enter the lists of operators.

Neither the oil industry of any particular nation nor any goverment should seek special and exclusive advantage in the depelopment of new fields.

The United States has no desire to interfere with the political relations of any power with a colony or protectorate, or a mandated area; but when it is proposed to use these relations to create exclusive spheres, within which the development of natural resources is to be confined to the parent or dominant country, and to extend and buttress these restrictions with exclusive alliances, we are justified in raising our voices in protest against the establishment of a system which we believe to be unjust, injurious and unwise.

With its position in world trade and the economic and financial weapons ready to hand, the United States could undoubtedly compel a new allotment of foreign oil territory so as to give it a share of what other nations are now proposing to keep for themselves. But we do not propose this. Might never makes right, and the smaller countries without similar means of forcing their way into such a division deserve better treatment at our hands.

Moreover, we do not believe any such measures will be necessary. The world is too anxious for petroleum. The it can obtain only if there be maintained everywhere a free and fair field to all with special governmental favor to none.

Britain Does Not Seek Oil Monopoly; Gives Britishers Preference

By Richard Airey

Vice-President, Roxana Petroleum Corporation

THE European situation today plays the leading part on the world petroleum stage. It is not unnatural that this should be so when one considers what must have been the feeling of these countries regarding their petroleum supplies in the critical days following August 4, 1914. It has been quoted on every hand that petroleum was as vital to the winning of the war as men, material and money.

Europe had the men, material and money, but not the oil. Their position was indeed serious. But the United States filled the breach and supplies of this most vital commodity saved the day.

No greater tribute could be paid to the petroleum industry of the United States than that it nobly responded to the call and maintained a steady flow of oil for the allied nations overseas.

But with the end of the war Great Britain could not continue to behold with complacency its utter helplessness in the matter of supplies of this valuable product. Even during the war Great Britain joined the noble army of wildcatters by expending $5,000,000 in searching for oil in England and Scotland.

Shortly after the armistice it was officially disclosed that the stocks of oil were at one time so depleted that the navy was seriously handicapped in carrying out its prescribed duties. It is therefore the logical outcome of the lessons of the past six years which actuates Great Britain with the desire to go out into the world to seek its own supplies of petroleum. It is the first principle of the doctrine of self-preservation.

Great Britain is today desirous of acquiring a share of the potential oil-bearing lands throughout the world. There will be competition, but competition of a healthful and stimulating character which is so essential for success of business enterprise. In this competition I am of the opinion that the rights of the United States and its citizens will be respected, and it may be recalled that the British premier in speaking of Turkey stated that the legal rights of America must be safeguarded.

Now with regard to newly discovered potential oil lands within the domain of European countries and their possessions, I am of the opinion that there is a great deal to be said in support of a policy which gives their citizens the first opportunity to acquire concessions, particularly for a product for which they have so long been dependent upon outside sources. The nations of Europe lately alllied in the war have, with two exceptions, no substantial production within their own domain, and they must, naturally, proceed with caution in framing a world policy.

Europe's requirements of petroleum products, and especially the requirements of Great Britain for its shipping and industrial needs, are enormous, and ever increasing, and surely there could be no objection if preference be given to her own citizens to acquire the oil reserves within her own lands and dominions.

But it is plain that there has been no general exclusion of any aliens from oil production in the British empire, as American interests are developing the oil resources of Canada, where concessions are held which cover large tracts of oil-bearing lands. American interests are also represented in the oil industry of Trinidad. And it may not be out of place to mention that America has a number of concessions in the Dutch East Indies and has within the past few weeks added to her holdings in that territory.

It seems to me that the problem which faces Great Britain today is to work out a policy which will be fair and non-discriminatory, and which will, at the same time, give some recognition to the prior rights of its citizens in the development of its petroleum reserves. There is nothing new in this theory, and have we not something along the same lines in the protection which has been granted the American merchant marine in order to foster and develop the maritime interests of the United States?

The great nations cannot afford at this time to engage in commercial rivalries which will tend to endanger the return of sane economic conditions thruout the world. Misunderstandings should be cleared away, and the fundamental principles governing our commercial relations should not be lost sight of in the partisan views which find expression, all too frequently, in the press of the United States and I may add, the press of Great Britain.

Wide circulation has been given on this side to certain utterances by unscrupulous and noisy promoters who are carried away with their own enthuisasm and utterances. The oil promoter is always with us. It is unthinkable that any sane-minded individual could accept some of the extravagant and misleading inaccuracies which continually crop up regarding the control of the future petroleum supplies of the earth.

I have previously made mention of the fact that it is not unlikely that there will be international rivalry, involving the great oil industry, because of the new vision which European nations have acquired during the past few years; but I wish to emphasize the point that a great deal of the material which has been published on this subject does not recognize the fact that Europe feels her absolute dependence upon foreign sources of supply and the attendant sense of insecurity which springs from such a dependence.

Motives which have been ascribed to

Britain And The Petroleum Problem

Europe Will Give Europeans Preference

MR. AIREY, who was invited to present the problem from the British viewpoint, took the place on the program assigned to Sir John Cadman, one of the leading oil men of Europe, and adviser to the British petroleum executive, who sent his regrets shortly before the meeting opened.

¶ He made it clear that the statements made in his address were purely statements of his personal opinion and were in no sense to be considered as official expressisons of a representative of the British government.

¶ Mr. Airey asserted that the attitude of the British and other foreign governments had been much exaggerated by "promoters" in the press of this country and England and denied that the British government has any intention or desire to acquire a monopoly of the potential oil fields of the world outside the territory where Americans now control.

¶ He did, however, defend the position of the British and other foreign nations in their proposal to give preference to their nationals in the development of oil resources within their own dominions or spheres of influence.

Great Britain of seeking to create a monopoly over the potential oil lands of the world are untenable. Such a grip of the world petroleum industry is impossible. The United States enjoys the balance of power in petroleum within her own possessions, and, in addition, she controls by far the greatest share of the production of Mexico.

Her holdings of the potential oil bearing lands in South and Central America are in excess of the aggregate of those held by all other countries. So strongly entrenched is the United States in the great world reservoir of oil that it would be well-nigh impossible to take the lead away from her, even assuming there was the slightest evidence of a desire to do so.

The European nations have no such aspirations. Their treasuries have been sorely depleted, and, coupled with far-reaching domestic and international problems, their lot is not an enviable one.

The handicap of adverse exchange must also be a cause of grave concern. I should imagine that this subject more than any other is exercising the attention of the best minds in Europe today. Is it fully realized from the standpoint of the petroleum industry what this depreciation in exchange means to the European nations? Is it fully realized that it requires over one hundred million marks to lay down a single cargo of gasoline in Germany, or twenty-three million francs to lay down the same cargo in France, or forty million lire in Italy or four hundred thousand pounds in Great Britain.

These figures are staggering, and quite put into the shade the typical stage money of vaudeville, but nevertheless they serve to visualize the burden which Europe is carrying in the unprecedented depreciation which her exchange now carries in the markets of the United States.

It requires the highest qualities of statesmanship and commercial enterprise to bring about a more normal state of affairs, and it seems to me that the entrance of the nations of Europe into the petroleum fields will go a long way to bring about the early return to normal business conditions. We must contrive to look at the facts without bias, as only in this way can we appreciate, even in part, the struggle which faces Europe.

If we kept these facts in mind, I imagine that we would have a more impartial and a clearer vision of the petroleum problems which confront Europe today. It is not America's problem; it is a world problem; and it is my hope that these remarks may help to raise the view of the oil man to embrace the European situation in his picture of the world problem.

Banquet Climax To Institute Meeting

Staff Special

WASHINGTON, Nov. 20.—The first annual meeting of the American Petroleum Institute, to the mind of those present, culminated fittingly in the banquet held Friday night in the ballroom of the New Willard Hotel.

President Thomas A. O'Donnell, of the institute, presided. Following a custom, which he said he learned in England, he proposed several toasts, one to the president of the United States, one to "our British allies," one to the sister republics to the south and one to A. C. Bedford, the leader in the foundation of the American Petroleum Insitute. The toasts were drunk (in cider) standing by the diners.

Two of the speakers, Norman H. Davis, under-secretary of state, and Pat Malloy, president of the Western Petroleum Refiners' Association, were unable to be present, their subjects being, respectively, "Petroleum as an International Problem," and "The Oil Man of the West."

Victor Murdock, chairman of the Federal Trade Commission, spoke on "Ethics of Business," and Thomas A. LeBreton, ambassador from Argentina, discussed "Future Development in South American Oil Industry" from the standpoint of his country.

Representative Philip Campbell, of Kansas, as a substitute for Mr. Davis, spoke on the menace to the business of the country of the bureaucratic method of government which he stated is becoming more widespread.

An unannounced guest at the banquet was Herbert Hoover, who was introduced by Chairman O'Donnell as a Californian and a world citizen, with the statement that Mr. Hoover had attended only on condition that he should not be called on to speak.

So urgent was the cheering of Mr. Hoover, however, that he rose and said a few words in praise of the unification of the oil industry and other industries into strong, vital forces.

This, he said, is particularly necessary in the case of the oil industry to enforce the rights of the American oil man to a share in the development of oil resources in foreign lands.

A musical program was furnished by an orchestra, and a trio of singers.

Improved Data Gathering Methods Is Taken Up At Group Meeting

Staff Special

WASHINGTON, Nov. 18. — The need for improving methods of gathering oil statistics, both as to crude production and consumption and refinery output, was brought out at the Group Meeting on Statistics held Wednesday morning at the Willard Hotel.

It was pointed out that there is need that these statistics be brought closer to date and that some way be worked out of securing figures as to consumption of oil products as well as their production. L. M. Fanning, head of the Division of Statistics and Publicity for the American Petroleum Institute, was chairman.

Various speakers brought out that, if the statistics of the industry could be made available for the week or month just passed, instead of several weeks removed, the industry would be saved to some extent from the periods it frequently finds itself in at present when there is an acute temporary overproduction or under-production. Now it lacks statistics as to what took place the past two months to guide it in today's business.

It was also pointed out that new trends in the business, the opening up of trade in new products must be recognized by the bodies keeping the statistical history of the industry. For example, it was shown there are not yet available figures as to gas oil production at refineries, as distinct from fuel oil output, in spite of the fact the demand for this product on a large scale has been recognized the past few years.

The value to the operating oil companies of applying statistics in their planning for the future was discussed by Joseph E. Pogue, head of the Research Department of the Sinclair Consolidated Oil Corporation, who spoke on "Function of Statistics in the Petroleum Industry." He stated the operating companies were continually erring thru not making proper use of such statistics as are available. He stated:

"The opportunity for statistical (economic) research in the oil industry is especially outstanding because of the rapid changes that are taking place in this activity and the important and extensive range of service rendered by the products of petroleum.

"Because of the rapidity with which the raw material base is shifting in geographical position, chemical character and volume, and because of the acceleration of demand over supply as working thru a multiple production type of fabrication, the economic balance between the various petroleum products is changing with notable rapidity.

"The detection and measurement of these conditions, and the coordination of the tendencies with market requirements on the one hand, and operating conditions on the other, afford wide scope for careful inquiry and effective results.

"Among the subjects that may be covered in such work are price studies, appraisals of supply and demand, measurement of marketing territory and requirements, analyses of consuming activities such as the automotive industry, statistical measurements of the effects of changing technology, and so on, not to mention more specific analyses making use of both accounting and engineering statistics in connection with operating conditions.

"In short, adequate statistics represents the means for attaining engineering control of operations, to the gain of increased productivity and more effective planning. The development and balanced employment of accounting, engineering, and economic statistics, directed from the research point of view, are essential to this end."

A paper was read on "Methods and Suggestions as to Collection of Refinery Statistics," prepared by A. W. Ambrose, chief petroleum technologist of the Bureau of Mines. H. S. Reavis, connected with publicity work in the oil industry for many years, and a pioneer in the gathering of figures as to crude production, told of the difficulty first encountered in this work. R. L. Dudley, editor of Oil Weekly, gave his views as to the attitude of the oil trade press in the gathering and analyzing of statistics.

Pooling Of World's Oil Resources Will Help All Nations Meet Needs

By George Otis Smith

Director, U. S. Geological Survey

THE United States Geological Survey's estimate of the petroleum resources of the world shows that the distribution, while unevenly balanced among nations, is evenly balanced between the eastern and the western hemispheres, altho the northern hemisphere appears to have at least five times as much oil as the southern.

Accepting the Stebinger-White distribution of the world's oil reserves, we may roughly set down the continents in order of wealth in oil as North America, Asia, South America, Europe, Oceanica, and Africa. In terms of regional distribution, more than half the world's oil reserves are believed to be concentrated in two intercontinental areas; one of these oil-rich provinces includes the North American and South American countries bordering the Caribbean Sea, and the other includes the countries of western Asia and southeastern Europe, with the Caucasus as an axis. On these two areas, then, each comprising about 2 per cent of the earth's surface and each containing about 30 per cent of the world's future supply of oil, is focused the attention of the great nations that most need oil.

In a review of the world's sources of energy—water and coal, as well as oil—we see North America taking first rank among the continents, with Asia a close second and Europe a poor third, altho we should remember that Europe has a much smaller area than either of the other two. Now, in considering how the world may best manage its ever-increasing power load, some aid may be found in a few comments on the differences between these three sources of energy—water, coal and oil.

Man has learned how to harness flowing water with great efficiency, but even in Europe and North America only about one-fifth of the potential power has yet been developed. Of course, even with wisest utilization, coal must again take up the burden as full development of water power is approached, for coal is the world's great source of heat and power, and the largest development of water powers is practicable only with coal power as the dependable "stand-by," ever ready to meet promptly any special demand.

Fuel oil is superior for use in transportation, and this use deserves priority over that for firing stationary boilers, for which coal should be substituted. Indeed, thoughtful regard for the future leads us to disallow even the claim of steam locomotives for fuel oil, for electrification of the railroads by water power alone or from water power stations and steam stations linked together is now the obvious way to make the best use of our resources of expendible fuel. In a word, the world has not oil enough to burn under either stationary or locomotive boilers.

The monthly consumption of crude petroleum in the United States and the exports of refinery products, taken together, exceed both the domestic production and the imports. This living beyond our means makes the question of our present oil supply not only a national but an international problem. And the outlook is not improving; indeed, never was the gap between consumption and production wider than it is now. In September of this year, as in August, the daily output of the United States oil wells was slightly over 1,250,000 barrels, but the daily consumption rose to 1,625,000 barrels. This daily deficit of three-eighths of a million barrels was met by imports from Mexico. Altho reputed to be the nation richest in oil, the United States cannot stand alone.

Our present knowledge of the facts of world supply and demand is amply sufficient to warrent us in continuing to advocate the open-door policy. Much can be gained for all nations by pooling the world's resources of so essential a raw material as petroleum. With about 60 per cent of the world's future supply concentrated in two regions while by far the greater part of the demand arises outside those oil-rich regions, there must be a world commerce in oil. The United States has given to all comers, whatever their nationality, opportunity to acquire oil lands within its territory, and the new leasing law puts no limit upon foreign participation in operating the public oil lands unless there is an absence of reciprocal treatment.

Of course, any nation realizes that the adoption of the open-door policy need not involve throwing away the key.

There is urgent need of pioneering the world for oil to meet the needs of this generation, but there is no warrant for regarding this advance into new fields as beginning a contest whose aim is world conquest. The present need of the United States for oil from abroad can be met only by world-wide exploration, development and operation by American companies backed up by our government; and we should expect other nations that are embarrassed by a similar or even greater discrepancy between consumption and production to adopt the same policy.

"Our government," says Secretary Payne, "would surely recognize the preferential right of another nation to the products of its own territory in time of need and under conditions of equitable compensation to our nationals, whatever their possessory rights."

However great our exigencies, then, we may set down this principle: The rights of the company that discovers and develops a foreign oil supply are subject to national rights and even a mandatory is created to develop the weaker nation, not to exploit it. If the nations of the world shall join to bring about a changed order, one that expresses the spirit of peace rather than of war, there can be no place in the international scheme for special partners or preferred stock, even tho the Argonauts of today, in their search for a flood of oil, are seeking a treasure of far greater value than any golden fleece.

The first thought in either a national or a world program for oil is to stimulate production; "more oil needed" describes the symptom felt by every nation, and new and larger supplies of oil is the remedy sought.

World View Of Petroleum Problem

The Open Door And The Golden Rule

THE open door as the policy to be adopted by all nations and the Golden Rule as the yardstick of diplomacy, were advocated by Director Smith in discussing the needs of the world for oil and the best means of making the oil supplies of the world serve the greatest number of generations.

"Much can be gained for all nations," said Mr. Smith, "by pooling the world's resources of so essential a raw material as petroleum."

The great need for oil as marine fuel, Mr. Smith declared, gives the ship priority for its requirements over the demands of the stationary or even the locomotive boiler. The speaker also hinted at higher prices as a method of checking wasteful consumption, saying:

"Plainly, the common interest in a limited resource is not served simply by regulation of price," he said. "It is of greater consequence to the public, either the people of a single nation or humanity as a whole, that the best use rather than the freest use be made of an invaluable resource.

"The first thought in either a national or a world program for oil is to stimulate production."

Make Progress Toward Reaching Standardization Of Oil Products

Staff Special
WASHINGTON, Nov. 18

IT seems likely that definite progress looking toward a solution of one of the oldest problems the oil refiner and jobber have faced—that of bringing some degree of uniformity into their laboratory testing methods—will come thru the work of the Group on Uniformity in Testing Methods.

This group held sessions Wednesday and Thursday morning in the Red Room of the Willard. The discussion was crystallized in the following resolution which was unanimously adopted and presented to directors of the American Petroleum Institute:

"Resolved, That the group conference on 'Uniformity in Testing Methods' recommend that the American Petroleum Institute call together and arrange to secure co-operation and coordination of all existing agencies and petroleum associations working for or interested in uniformity in testing methods, to arrange for a central referee testing laboratory, the prompt dissemination of information concerning standard methods of test and research work looking to improved methods of test."

This resolution was introduced by O. P. Keeney, of the Tide Water Oil Company, New York, and was drafted with the aid of E. E. Grant, secretary of the Independent Oil Men's Association, Chicago, and T. F. Kuper, of the Mid-Co Oil Sales Company, Chicago.

Discussion on the subject of securing uniform methods in testing was very full and frank, particularly at the Thursday morning conference, T. G. Delbridge, of the Atlantic Refining Company, Philadelphia, acting as chairman . Most of the time the discussion was three-cornered, involving the merits of the American Society for Testing Materials to do this work, the American Petroleum Institute and the government technical agencies, such as the Bureau of Standards and Bureau of Mines.

Some Object to New Body

While objection was stated to creating a new body or agency to do this work because of the various organizations which have already undertaken to devise standard methods of testing which should be adopted generally by the trade and consumers as well, it was pretty generally believed by those who gave their views at the conference that the subject was one which should be settled within the industry and that the institute, by acting as coordinating body, could make use of the work along this line which has already been done and could push the entire job along to definite results.

It was also pretty generally agreed that the institute could best serve as a referee or arbitration body in the case of disputes. As an active factor in this work the need of the institute for a laboratory was seen, where research work in standardizing methods of testing could be carried on.

The final recommendation of this group conference as it was passed in to the directors, coincides very closely with the plan Secretary Welch of the institute announced some time ago whereby the institute would seek to establish a research laboratory for the study of petroleum problems common to the entire industry. Dr. Van H. Manning, formerly director of the Bureau of Mines, was made head of the research department of the institute, with this end chiefly in mind. The work in general of that particular department is to be as wide as possible, but the work of standardizing methods of testing is a service fitting nicely into the province of that department, and there is no doubt its importance is recognized. Its need has been seen for the past twenty years and more.

Several practical refiners and oil chemists brought up specific examples showing the confusion now arising between the seller and buyer of even such standard products as cylinder oils, gasoline and fuel oil because of the difference in the manner of applying the common commercial laboratory tests. G. P. Brockway, head of the Seneca Oil Works, Warren, Pa., told of sending out 19 samples of the same cylinder stock and of receiving reports as to its viscosity at 210 degrees F., ranging from 180 to 239 seconds and reports as to its flash point varying from 560 to 600 degrees F.

Varying Result of Tests

A. P. Bjerregaard, chemist for the Empire Refineries, Inc., with headquarters at its Okmulgee, Okla., plant, showed of variances arising in the work of that company's six laboratories where practice has been standardized to a high degree. He stated the use of a copper wire to direct the flow of oil from a thermometer in a gasoline distillation test and prevent it from running down the thermometer stem greatly cut down variances in testing.

Secretary Grant, of the I. O. M. A., as did also Mr. Kuper, made a plea for the needs to be considered of the small jobber with little or no technical training and limited laboratory facilities and knowledge as to how to use what he has. His relations with the refiner are often strained thru the inability of the two to get together and agree on a method of making the tests they use in their every-day business relationship. Not only simple methods of making tests are necessary, but the language describing methods of testing must be such that no ambiguity can arise.

The work in standard methods of testing of the American Society for Testing Materials was discussed by Dr. K. G. Mackenzie, consulting chemist for the Texas Company, New York, and secretary of Committee D-2 on Petroleum Products and Lubricants of the A. S. T. M. before this group meeting. The general opinion expressed at the group conference was that this organization works too slowly and to too fine a degree of accuracy for the present immediate needs of the oil industry.

The point was also brought up that this society's work is done by consumers of oil products as well as producers, in this case the refiners, which was considered an objection by some.

The interest of the Bureau of Mines in uniform testing methods was taken up by N. A. C. Smith, petroleum chemist of that body, and Dr. W. H. Herschel, of the Bureau of Standards, told of its work along this line. In the discussion Dr. Herschel brought out that three things are needed in a discussion of this subject: First, a clearing house for information as to what is already being done by various organizations along this line; second, a disinterested laboratory where samples can be sent in case of disputes, and, third, as much research work along this line as funds are available to carry on.

The point was brought up as to whether or not these two government agencies could do the work it was proposed the institute should take up. The objections were that sufficient funds were not available and probably would not be forthcoming from congress for several years and that the alternative of having those funds furnished by private individuals or institutions was hardly feasible; also that these government research bodies were geared to work to finer degree of accuracy than the needs of the trade call. for.

The need for standardized testing methods on the part of the consumer particularly was taken up in a talk before the group the first day by W. F. Parish, of the Sinclair Refining Company, Chicago.

The viewpoint of the Department of Standards and Tests of the National Petroleum Association, which has done considerable work along this line, was presented by Mr. Keeney, who is chairman of that department. It favored the establishment of an American Petroleum Institute laboratory. The conclusion of his remarks follows:

"After discussing this matter among the members of our department, I am authorized to speak for the members of our department and to urge the American Petroleum Institute to establish and maintain such a laboratory. It seems to us that the institute would be the proper agency to maintain such a laboratory because it represents all phases of the petroleum industry in all sections of the country.

"It is very probable that once such a laboratory was established it would be able to pay its running expenses at least by charging a nominal fee for the services rendered.

"If the institute so desired perhaps it might avoid some expense and duplication of equipment by making arrangements with some technical institution of higher learning to do the actual work under their guidance and supervision.

"The Department of Standards and Tests of the National Petroleum Association not only urges the institute to establish such a laboratory, but pledges its hearty support and co-operation in making this enterprise successful."

Mr. Kuper gave an address before the group meeting following closely the talk on the great need of the industry for uniformity in testing methods from the viewpoint of the oil company sales department that he gave before the recent Denver meeting of the Independent Oil Men's Association.

Oil Men Deserve U. S. Protection In Mexico; Intervention Unnecessary

By Frederic R. Kellogg

Counsel for Doheny Companies

THERE are hopes of a new day for Mexico. There are some evidences here and there of a most encouraging nature. Industrially speaking, conditions have improved. So far as transportation is concerned, they are much better. Peace is largely established throughout the republic at the present time. Depredations have lessened. But back of all this hopeful aspect—and it is a hopeful aspect despite what I am now about to say—there is growing, and becoming more and more distinct every day the spectre of bolshevism. There is a situation which, if not handled by the incoming administration as it should be handled, is fraught with the gravest danger not only to Mexico itself but to the foreigners who have entrusted their enterprises to its care.

As to what Mr. Obregon may be able to do, we, who think we know something about him have high hopes. We believe him to be a strong man, who is capable of courage, a man who more than almost any other within the last ten years, seems to have grasped some of the fundamental problems with which he is to be confronted, and whose utterances, so far as he has permitted himself to make utterances on certain topics, lead us to believe that he intends to adopt new principles more in the line of enlightened dealings both as to Mexico's dealings with the outside world and with her own problems.

Mr. Obregon has said on a number of occasions that he believes it best for the welfare of Mexico that she should adopt policies which would lead to the cultivation of friendly relations with the United States. Up to the present time all of his utterances have been hopeful. My personal belief is that if he has power to do these things, they will be done and justice will be accomplished so far as the petroleum industry is concerned. It remains for the future to say whether or not that power will be his.

In the meantime the present government, as you know, is applying for recognition—and here is the humorous feature. Once in awhile a little streak of humor illuminates the dullness of the day. They are applying now for large loans in New York for the present government of Mexico, and they seem to be a little surprised that they do not get them. It reminds me of a story which you probably have all heard, but it is so appropriate that I am going to transgress sufficiently on your patience to repeat it.

The story refers to a melodrama which was presented some years ago, and it was **some** melodrama, according to the accounts. In the first act the villain put arsenic in the heroine's tea. In the second act he tried to hurl her down into a chasm 4,500 feet deep. In the third act he tried to tie her across a railroad track before the oncoming night express running 84 miles an hour. In the fourth act he knelt before her and said, "Dearest Aphasia, why do you deny me your love?"

The argument is thundered forth by some of our American Carranzistas—and there are some—that we are interventionists; that we are seeking to embroil the United States with Mexico. I was brought up to think that the term "intervention" meant interfering in somebody else's affairs, not trying to take care of your own. According to the Mexican theory, the Carranzista theory—I want always to draw the distinction between Mexico and the Carranza element because we have the hardihood to protest against their aggression in our affairs, we are interventionists. Well, that of course is simply the distortion of a diseased mind, or a mind that thinks other men's minds are diseased. If a man hits you and tries to take away your pocketbook, you must not repel his efforts, because you will be guilty of undue interference with his affairs.

The petroleum industry so far as it is interested in Mexico is not today, never has been, and I hope never will be, in favor of armed intervention in Mexico.

It has more to lose, perhaps, taking into consideration the nature of its property, than any other Americans who have gone into that Republic to develop commercial industries. Armed intervention is unnecessary if the matter is handled with proper sagacity by the United States without it; and I do not believe that it will ever be necessary to resort to that undesirable method of protecting private interests or the national honor.

Size Does Not Forfeit Rights

Lastly, they say that if the United States dares to use even its great moral power to compel the comparatively small state of Mexico to do the thing which it ought to do, it is an act of tyranny and of invasion of Mexico's sovereignty; and in the second place, in line with that argument, they say that if that is done pursuant to a desire to help what they term "big business," it becomes an international crime.

There are two or three thoughts here which I shall ask your patience for a few moments to analyze with me, because they are of vast importance, not only in this controversy, but to all of you, and to all the United States.

The first thought is that a govern-

Mexico And The Petroleum Problem

The Rights of American Business

IN his address Mr. Kellogg digressed to riddle with biting sacrcasm the vague thinking dreamers who denounce "big business" as "materialistic" and lacking "idealism." At the same time he sounded a bugle call to successful American business men to stand upon their feet, looking the world squarely in the eye, regarding their success and their honorably won wealth as a badge of honor and not a brand of shame. He declared that some of the big business heads of the country have been driven to an attitude that is almost cringing by the repeated attacks on their companies and interests. Some of his hot shots were:

"Business has its own idealism but it must be such that it permits commerce and successful commerce to exist."

"The man who propounds a code of alleged idealism which criticizes the making of money, which teaches that wealth is a disgrace and success a sin, is a traitor to his country because any such idealism is a false and noxious thing, not idealism at all, and if it thrives enough it will throttle and stifle the entire commercial life of the nation and of the world."

"Are you business men of clear consciences going to be always on the defensive or are you going to try to teach the world that big business honestly conducted and fairly done is successful business, and a national asset as well as an individual advantage?"

Mr. Kellogg in his address went exhaustively into the status of the American companies owning properties in Mexico, showing that they did not obtain their holdings through concession but by outright purchase of the fee or oil rights from individual Mexican owners of the various tracts.

He also traced in masterly fashion the illegal acts of oppression practiced against the American companies by the Carranza administration and refuted the arguments of those propagandists in the United States who hold that the American companies are not entitled to protection from their government. This part of the address is omitted because it has been fully covered in a previous article by Mr. Kellogg which was published in National Petroleum News some months ago.—Editor.

ment, if it is large, merely because of its size, forfeits its international rights, or those which it otherwise would possess.

The second thought is that a government, if it is sufficiently small, gains by reason of its smallness international rights which it would not otherwise possess; that it gains thereby a moral right to act immorally.

The third thought is that despite the clean cut, honorable, fair and honest manner in which any big industry may conduct its business, if it is big, if it is rich, if it is commercially powerful, it is doomed to lose the respect which otherwise would be its due, and must be considered as a presumptive malefactor.

What Idealism Is

In connection with those arguments, both in Mexico and in the United States, where we hear plenty of it, you are also very apt to hear a great deal about the gross materialism of big business, and the absence of idealism.

There are many officers of corporations, some of whom I have come into personal contact with, who have become so affected by attacks and assaults of that nature in this country, wholly independent of Mexico, that they have become humble, chastened, almost cringing, for fear of some new public outburst against their industry. If their rights are infringed, they are afraid to say so. They adopt circuitous, devious means of obtaining redress. Secrecy is the one thing they crave the most; and naturally, many people looking at these manifestations of fear, think that the things are in themselves inherently wrong, believe that smallness is a merit, that greatness is a shame, that mediocrity is commendable, and that commercial success is a crime.

There are concerns in this country—but they are not all big ones—who doubtless have reasons for secrecy, and good reasons. Some of them I come in contact with; some of them you know. But there are other concerns who have dealt fairly by the public, who have given their employees a square deal, who have given the world a dollar's value for every dollar they received, who have risked their time, their money, their fortunes, their business future in the endeavor, and the successful endeavor, to wrest from the earth the treasures which are there, which no man ever saw before, who have gained wealth by so doing, but have brought wealth greater than that which they have gained to a world which needed it.

Among those industries, I believe that the one that I have the honor to address tonight stands pre-eminent. Why should business, small or big, if it has a clear conscience, be afraid of its bulk? Why should it be ashamed of its success? Why should it be reluctant to insist upon the protection by its government, if need be, of its clear rights, wrongfully infringed?

Why should it be always upon the defensive, as though it expected that some nefarious transaction or course of conduct was momentarily to be disclosed, instead of standing proudly erect before its fellowmen, and insisting upon itself receiving a square deal?

I believe the time has come for a great deal of talk upon that subject, and for a great deal of action, more than anything that has been done heretofore. I believe the time has come for the world to be taught, if it does not know, that in the great majority of cases, whether business is small or big, success comes more from honesty than from dishonesty, from fair-dealing rather than from unfair dealing, from brains rather than brawn; from the venturessomeness and courage of the few rather than from the efforts of the many; from the originality, the inventiveness, and the high imaginings of the leaders rather than merely from the service, however strenuous, however faithful, however diligent, of the followers.

I believe the time has come when the world, somehow or other—I do not know if it is possible, but it must be tried—must be taught that without great commercial enterprises a nation is today a dead nation; that great commercial enterprises mean successful, efficient commercial enterprises; that efficiency means self-protection, and it also means the acquisition of wealth and of bulk if it goes on through the years. I believe the world should be made to realize that that thing is not in itself wrong, but it is in every way commendable, and that wealth thus realized is not a badge of shame, but is the outward and visible manifestation of that efficiency without which no true success can exist.

What are you men that have clear consciences in the business world going to do about that sort of thing? Are you going to be always on the defensive, or are you just going to try to teach this country and the world that big business honestly conducted and fairly done is successful business, and is, as successful business, a national asset as well as an individual advantage?

That is the deeper thought behind this whole Mexican situation. That is where you come into it, in part. That is where your nation is interested, and that is something the world must take account of if things are to go on, and civilization is to be built upon anything resembling a good, sound, true material foundation as well as idealistic theories alone.

Pardon that seeming digression. I hope you will agree with me that it was not wholly unwarranted.

It is unnecessary to speak to you about the importance of the continuance of the Mexican oil supply, and at a reasonable price, to this nation. I shall pass that. But there are two other thoughts in that line that I do want to call your attention to and that you already have anticipated me on, and one is this:

There is a moral question involved in this entire transaction. The Eighth Commandment was not limited to individuals. It either is of force in this world today, or it is not. If it is not, it is time we knew it. If it is, this international effort is as morally reprehensible as the effort of a single individual would be to steal your purse. I do not believe the American public is likely, if it once can understand the facts, to get any other than that point of view with regard to the true situation.

In the second place, what about our foreign commerce? Is there any enlightened man today in this country who would for a moment disagree with the statement that foreign commerce is absolutely essential to the life of a nation? Present events are confirming that beyond the possibility of dispute. How are you to have foreign commerce? By getting men to go, by getting men to put their money into it, to risk their business future in it, to give their lives to it, to take the personal risk which it so frequently involves, and which it did involve in the earlier history of America and the latter history as well.

Men can and will do that if they know that when they have made a success they shall be allowed to keep it, free from arbitrary interference on the part of others who have lacked the initiative themselves to bring about those results. If, however, this precedent is once established, and the word goes through South America and Europe and Asia that the American nation is an easy mark, that it casts its people forth, as William Jennings Bryan said, "The man that goes south of the Rio Grande does so at his own risk," that they cannot look to their government for protection, no matter how honorable their enterprises may be, no matter how sincerely beneficial they may be to the nation as a whole—if that precedent is to be established, and it is to be known of men, will our foreign commerce continue, or will it wither and die?

But with the principle once established that an American is an American at home and abroad, that he is entitled to the consideration and the kindly consideration of his government as long as he behaves himself and acts legally, wherever he may be, there will be no nation in this world, no matter whatever the future may have in store, that will cause America to take a rear position in the foreign commerce of the world.

One word more, and I am through. "What is the thing to do now?" has probably been in your minds as you have listened to my long harangue. "Must we declare war on Mexico? Must we occupy it with troops? Must we involve our boys in the same sort of thing that the Great War brought to so many homes?"

It is not necessary. It will not be necessary as long as the Mexican or any other government is made to understand, not merely by words but by that indefinable something which must be back of all words, "Thus far shalt thou go, and no farther!"

There is in that suggestion no policy of bullying of small nations, no swaggering, swashbuckling attitude toward the world. It is a policy of peace; for your true fomenter of war is not the man who insists upon righteousness, but the man who encourages the wrongdoer in his wrongdoing. It is a policy of respect by the American nation for its own honor and for the rights of its citizens. It is a policy which was expressed beter than any American public man has expressed it by the great Mexican liberator, Benito Juarez, when he said, "Respect for the rights of others means peace."

I believe that the better class in Mexico today is realizing that she has taken a false step; is realizing that if that course is continued she is in danger of placing herself where Secretary Bayard, in the time of President Cleveland, placed Ecuador and Peru, saying: "They have placed themselves outside the pale of civilized nations." I believe that in Mexico itself today there is a powerful body of public opinion, as far as Mexico can have a public opinion, which is only among the governing classes, and also in the mind of president-elect Obregon, which I am hopeful will lead to a speedy solution of this matter at a not distant day.

But if those ho--- shall be disappointed, is this nation willing to abandon those of its children who have tried not merely to advantage themselves, but to advance the prestige and the commercial powers of this nation by developing in a foreign and supposedly friendly country a commodity of which this nation today has need?

I do not believe the answer to that question will ever be made in the negative.

Mexican Representative Challenges Kellogg; Does Not Answer Questions

Staff Special
WASHINGTON, Nov. 20

WHAT was intended to be an answer by a representatve of the Mexican government to attacks made in an address at the Wednesday evening session against the confiscatory decrees and action of the Mexican government in relation to American oil companies, by Frederic R. Kellogg, general counsel for the Doheny interests, enlivened the afternoon session yesterday.

When the session was over it was the general opinion of the oil men, who crowded the ballroom of the Hotel Raleigh to hear both sides of the case presented, that the charges of Mr. Kellogg had not been answered and that the statements and attitude of R. V. Pesqueiro, special representative in the United States of the de la Huerta government, indicated that resumption of an attitude of fairness and justice toward American companies by the Mexican government is considerably further off than had been hoped by many of those conversant with the situation.

Following the address of Mr. Kellogg on Wednesday evening, Mr. Pesqueira challenged the statements of Mr. Kellogg and asked permission of the institute officers to answer the statements before the end of the meeting. The privilege was granted. At the same time, Mr. Kellogg, who had returned to New York, was reached on the long distance telephone, and promised to be present when Mr. Pesqueira appeared.

The Mexican representative defended Article 27 of the Carranza constitution, which provides for confiscation of property bought and paid for by American companies, and yet denied that confiscation had taken place or is intended. At the same time, he asserted that the provision of the constitution and the Carranza decrees would not be made retroactive.

He based his assertion of the justice of the position of Mexico on the statement that "Mr. Doheny has been amply repaid for all the investments and risks he made and took in Mexico," and intimated that if the heads of the American companies would go themselves to Mexico and confer with the Mexican officials the situation would be straightened out; that lawyers were hindering a settlement. Mr. Pesqueira had a hard struggle with English in making his address and there appeared a considerable sentiment in his favor when Mr. Kellogg took the platform to answer him and propound questions.

This sentiment was completely alienated, to judge by the remarks of listeners, after Mr. Pesqueira had made his final talk following Mr. Kellogg. The latter, seeking to obviate a situation in which a seeming advantage might be taken of the Mexican representative, proposed that the institute arrange a joint debate where any representatives of the American oil companies might meet any defenders of the Carranza doctrine in joint debate, so that the facts of the case might be thoroly thrashed out from both sides, and the truth put before the American oil industry and the American people.

Pointing out that Mr. Pesqueira had dealt only with generalities thruout his speech and had not attempted to controvert or answer the facts, the representative of American interests in Mexico had presented, Mr. Kellogg propounded eight questions upon the answers to which, he said, the future status of the oil situation in the southern republic depends.

Altho Mr. Pesqueira had the last opportunity to speak, he made no effort to answer any of the questions in his closing remarks.

Discussing the statements of Mr. Pesqueira in his opening speech, Mr. Kellogg said:

"It is all very well for Mr. Pesqueira to say 'our laws will not have any retroactive effect,' but let me go back to the days of Mr. Carranza and Mr. Cabrera and recall to you that Mr. Cabrera, in a statement he made, advanced the doctrine of non-retroactivity as applicable to petroleum as meaning that the Mexican government, in an act of mercy and of grace, would not hold us to account for the value of the petroleum we might have extracted from those lands before May 1, 1917.

"Let me recall to you that Mr. Pesqueira in a recent statement has made, even more emphatic than the things he has said today, that those laws to which I have alluded were not retroactive. Does he know, and if so, what did he mean—that today there are 1,029 denouncements filed under the Carranza decrees, of which the largest portion had been filed since the end of the Carranza administration, and that there is today in force a rule in the department which prevents the men who thought they were the owners of those lands from drilling upon them as long as those denouncements remain outstanding? If he does know that, what is his interpretation of the word non-retroactive?

"He says no property has been confiscated. What does he mean by confiscation? The property is there and under the existing rulings the men who believed, and had the lawmul and moral right to believe that they owned it can not enjoy it without buying the title and making arrangements with those third parties who have seen fit to file denouncements under the Carranza decree.

"I am one of those who believe, and I think there are others in this room so believe, that plain speaking clears the air. I do not believe in generalities, I take no stock in theories. I want facts. You want facts. One underlying fact in the oil situation in Mexico is this: Does the present government or any future government of Mexico intend to adopt and itself continue to enforce the confiscatory policy of the Carranza constitution and decrees?

"The time has come when it is the duty of those who represent the present and not the future Mexican government to take the world into their confidence and let us know what we may expect, so that the cloak of generalities may be removed and we may get the exact facts and an absolute prognosis of the future."

Mr. Kellogg's Challenge To Mexico

Eight Fundamental Questions

WHAT do you mean by "non-retroactive?"

Does the Mexican government admit that American oil companies who bought or leased lands in Mexico prior to May 1, 1917, had the exclusive right, free from governmental licenses or interference, to extract petroleum from those lands?

If you admit that those rights existed prior to May 1, 1917, do you believe that the constitution adopted in that year and the series of decrees took away from the American producers any part of those rights?

If you do believe that those rights were thus affected, what does the republic of Mexico intend to do about it?

Will you stop the reception of further denouncements, whether of Americans who believe in the Carrancista doctrine or by Mexicans, upon lands honestly acquired by American companies for oil purposes before May 1, 1917.

Will you stop the granting of alleged concessions which are in the same class with these denouncements until a later date?

Will you stop the proceedings under the denouncements and the concessions already outstanding?

Will you allow us to drill our properties without first asking leave of those gentlemen who have seen fit to assert a better right than we possess, basing that alleged better right upon the Carranza decrees and the constitution of 1917?

Banquet Of American Petroleum Institute At New Willard Hotel

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Crude Output Can Only Be Maintained If Fair Prices Prevail

By R. D. Benson

President, Tide Water Oil Company

PETROLEUM owes its present high place in industry to three things: first the invention of the Lowe water gas process, by which material for making illuminating gas was changed from coal to petroleum distillates; second, the invention of the internal combustion engine, which brought gasoline into its own; and third, the development of the use of fuel oil in place of coal, notably on the high seas.

In my judgment, it is impossible to divorce the production of crude oil from its market price, and it is my purpose to show the dependence of one upon the other. In covering my subject I cannot divide the present sharply from either the past or the future, so I will start with January 1, 1916. On that date we had been in the World War nearly nine months. Stocks of petroleum on hand were 145,000,000 barrels, and the price of Oklahoma crude at the wells—the basic price of all grades of crude—was $2 per barrel. On March 21 the Germans began their last great drive on Paris. Three days before, the Petroleum Division of the Fuel Administration, under the wise direction of Mr. Requa, had permitted an advance of 25 cents per barrel. This, I happen to know, was due to representations made by American officials in France that the demand for gasoline and fuel oil would be greater than ever before, and that every effort must be made by the American producers and refiners to supply these paramount needs of the allied forces. There was no further change in crude prices until November 20, 1919. Prices of petroleum here held much lower than those of any others all thru the war period; but the result of thus keeping down prices was shown in great depletion of stocks. Production during 1918 was 255,927,000 barrels, but on January 1, 1919, stocks had been reduced to 121,727,000 barrels, or a reduction of over 24,000,000 barrels.

The first seven months of 1919 were a disappointing period to the oil trade. We had been working under high pressure to turn out what was so desperately needed for the war. At the beginning of 1919 the requirements of all the warring governments had been filled and large government stocks accumulated; therefore there was a sudden slump in consumption which lasted for the first seven months of the year and resulted in increasing stocks of crude 18,365,000 barrels in the field, in addition to 6,730,000 barrels in refinery stocks.

In August, however, most of our boys had been demobilized; industry was going ahead at full speed to supply the normal demands of our 100,000,000 population, long deprived of what it considered necessities, and crude consumption made a tremendous jump. The average daily consumption of domestic crude from January 1 to August 1 was 940,000 barrels, but for the next five months the average was 1,153,000 barrels per day.

Stocks on January 1, of the present year, were 129,000,000 barrels; production for 1919 having gained 21,800,000 barrels over 1918, going from 355,927,000 to 377,719,000 barrels. Since November 20, 1919, there have been four advances in the price of Mid-Continent crude, the latest on March 1, 1920, bringing it up to $3.50 per barrel. This was made necessary by the fact that production was barely keeping pace with consumption, the production for 1919 having been only 2,200,000 more than consumption, which was 275,559,000 barrels.

In the early part of the year the Federal Trade Commission was intrusted, under the Dyer resolution passed by congress, to investigate the petroleum trade and ascertain why there had been so considerable an advance in prices since the close of the war. It was not at all difficult to prove to the commission that, if there had been no advance, there would have been an oil famine. A prominent producer was asked by one of the commission's examiners what was necessary to bring about an increase in production sufficient to avert a famine. The answer was: "Three dollars and a half a barrel for Oklahoma crude," and this has evidently proved correct, bearing out my point that, given the price to warrant the risks of the business, producers will find the crude.

In order to get the proper perspective on the growth of the industry in the United States, let us turn back twenty-five years. In 1895 production came largely from Pennsylvania and New York and amounted, all told, to 30,959,000 barrels. There were 7,138 wells completed and the price of Pennsylvania crude (then the base) ranged from 95 cents in January, up to $2.60 in April and back to $1.50 at the close of the year. Wells completed in 1919, twenty-four years later, number 29,072, and the price of Oklahoma crude (now the base) ranged from $2.25 in January, to $2.75 in December. In the first ten months of this year, 29,212 wells have been completed and the year will probably show approximately 36,000 wells.

The present price of crude, however, is not to be taken as signifying that the producer is making any large profits in his search for new fields. Twenty-five years ago the cost of drilling a well in the producing areas of the time averaged around $2,000. Times have changed. One of the western producers has said:

"A stratum of sandstone, known as the Bartlesville sand, is the principal producing formation of the Oklahoma oil fields. Oil was first discovered, in commercial quantities, on what is known as the "Big Lease," about three miles west of Chelsea, Oklahoma, about 1895. This sand on the creek bottoms in that locality was found at a depth of about 300 feet; since then this sand has been traced, as it dips into the earth, first north, then west and finally southeast, until we find it at points north of the town of Cushing and near Quay, Oklahoma, and approximately 100 miles from its point of discovery, at a depth now of 3,400 feet.

"It took about 200 feet of casing to drill a well where the sand was first discovered; the cost of drilling was

Relation Of Price To Production

Possibilities in New Fields

THE relation of the price of crude to its production in this country was the subject of the early part of the address of R. D. Benson, president of the Tide Water Oil Company, his point being that a low price for crude has cut production down for the period that price prevailed. Mr. Benson expressed his opinion that the supplies of crude for future needs would be forthcoming if the price of crude were kept at a point that would keep the wildcatter active and enable him to secure funds to drill to the present depths at which oil is being sought.

¶He reviewed the possibilities as seen at present in Montana and Wyoming in this country, in Mexico, and in Colombia, and even in the far north, pointing out that it will be many years, however, before actual production from these distant points can hope to reach our markets.

about 50 cents per foot, and a completed well, ready for pumping, cost less than $1,000. North of Cushing we are now drilling wells which require approximately 10,000 feet of casing, cost $650 per foot to drill, and a completed well there costs about $60,000. In the early days of Oklahoma we used to worry about whether we would ever get our money back when we drilled a well that cost over $5,000. Now, when they cost less than $25,000 or $30,000, we feel we are getting off easily."

Old Production

The back log of present-day production is the 200,000 or more small wells which have been drilled during the past fifty years, which are still producing, some in such infinitesimal quantities that it hardly seems possible that they could be kept in operation at a profit. Under the stimulus of high prices, these wells are kept in operation and in many instances improved methods of securing oil from a seemingly exhausted sand has increased their production considerably. In the Bradford and Allegheny fields the Tide-Water Pipe Company, Ltd., for example, is attached to nearly 18,000 wells. In 1909 that company ran 1,531,000 barrels from this field; in 1913 the runs had fallen to 1,267,000 barrels, or a decrease of over 17 per cent. In 1920 its receipts, figured on the past ten months, will be 1,568,000 barrels, or an increase in eight years of 23.8 per cent This is due to the so-called "water-drive," by which water pressure is put on the rock to supplement the exhausted gas pressure.

The average daily production of all the wells in this field to which the Tide Water was connected in 1911, was 24.47 barrels per well; so far this year the daily production has been 24.28 barrels. They are now connected to 17,926 wells as against 15,048 in 1911, with no expansion of area. Many of the old wells, however, are not pumped oftener than once a week. In the Illinois field, where no such process is used, the production of the wells to which Tide Water is connected has fallen from 3.22 barrels in 1911, to .99 barrels in 1920.

New Production

In spite of the vast production which is still coming from old wells, current production could not be maintained, much less increased, without a great deal of new production being added each year. The American Petroleum Institute's statistical department has furnished me figures obtained from about twenty large producing companies, showing that their production for 1919 aggregated 172,000,000 barrels, of which 45,000,000, or 26 per cent, came from wells completed in that year. It therefore seems probable that with present production running in the neighborhood of 475,000,000 per annum, not less than 100,000,000 is coming from wells less than a year old.

Backing Production

We have all recently seen the effect of tight money in the slowing down of industry; it is not possible that the cause and effect so easily traceable in other lines will pass by the oil trade. The producer who has wildcatted for oil at a cost of, say, $50,000 per well, is very likely to find that his bank will not carry him to the extent which it has been doing in the past. The day has gone by when the oil well supply companies will furnish all the materials needed by a producer to develop a good-looking lease and even loan him cash to pay his drillers, as they have at times done in the past. It, therefore, seems altogether probable that unless consumption falls off rapidly production will again be falling behind. I have inveighed against false prophets earlier in my remarks, and I am not going to indulge in anything of that sort myself; I have given you the facts—you may draw your own conclusions.

Mexican Production

I have not so far said anything about a very important feature of present-day oil production, and that is the enormous quantity coming from Mexico; and I shall now touch on this topic but lightly. Mexican imports into the United States have increased from an average daily rate of 203,000 barrels in January of this year to 388,000 barrels in September. During the war, owing to the necessity for using all available tankers for overseas work, shipments from Mexico were greatly curtailed, far below what they would have been under normal conditions.

During the early part of 1919 the changing of industry from a war to a peace basis was unfavorable to the development of uses for Mexican crude. Then in December, 1919, the Tepetate pool, at the northern end of that sickle-shape belt running from Des Bocas on the north to Tuxpam on the south, went to water over night. A year earlier the great Potreto de Llano well, belonging to the Mexican Eagle Company, after producing over 100,000,000 barrels of oil in eight years, was suddenly and completely drowned out by salt water. This is the southern end of the sickle-blade. The distance between the two pools is about 25 miles, and only recently and in one place has it been found to be over about five-eighths of a mile in width.

Nevertheless the amount of oil to be taken from what apparently remains of this wonderful Klondike of the oil world is almost unbelievable. In the first seven months of 1920 the imports from Mexico were 68,148,000 barrels, against 37,550,000 barrels in the corresponding period of last year, and present shipments are limited only by the capacity of tankers available to carry the oil away. By far the greater portion of the production comes from the southern Mexican fields, and this crude yields an average of about 12 per cent of kerosene and gasoline, while the remainder is utilized only for fuel oil. There is apparently an unlimited market now for fuel oil made from this Mexican crude, but it will take time to furnish facilities for transporting it, and to install equipment for burning it. The quantity of kerosene and gasoline obtained in reducing Mexican crude to a state where it can be handled safely as fuel oil, is so small that it does not menace the market for products of domestic crude.

New Fields

Looming on the horizon today, as was Oklahoma fifteen years ago, are the new fields of Wyoming and Montana. Many producers believe that we have in these two states a producing area equal in wealth to that of the Mid-Continent fields. The daily average production of these new fields has increased from 38,000 barrels in January of this year to 54,000 barrels in September. But they are further from the great markets, and transportation both of materials and products is an element which will make for slower development in that field.

Two distant stars are just rising into view; one in Colombia, 400 miles up the Magdalena river, where high-grade petroleum has been found in quantities sufficient, apparently, to warrant earnest consideration; the other, a large well reported as drilled by the Imperial Oil Company 1,000 miles north of Edmonton in the Province of Saskatchewan, quite within the Arctic Circle. If a considerable production is developed in this northern territory, it is difficult to foretell how it can ever be made available for the use of mankind, for the next generation or so anyway.

The situation in Colombia is not so difficult, tho it is difficult enough, to stagger any but the most sanguine and wealthy producers. The Magdalena river is the only means of reaching that territory; its lower reaches are huge morasses where only boats of the shallowest draught can navigate; the inhabitants are uncivilized Indians. To reach the producing district 400 miles of pipe line will have to be built, and over mountain ranges to avoid the morasses of the lower river. I have heard it estimated by one who ought to know that it would take ten years' time and $25,000,000 to put into operation a pipe line to the present producing district, even after developments had shown that oil could be produced there in quantities sufficient to warrant the investment. Therefore, like the field in the Arctic regions, this oil can only be considered as reserve storage for the demands of the future.

I believe that production of the United States will be entirely governed by the price paid for crude oil, for a longer period than anyone, no matter how learned, can safely predict; and I will close as I began, by voicing my father's belief that kind providence never limits the supply of anything so valuable to mankind as petroleum. To this I add only that price will bring production, and that territory still unknown will be found to meet the needs of future generations as they arise.

Asks Tax Department To Call In Engineers

WASHINGTON, Nov. 20. — The group on taxation of the American Petroleum Institute began its sessions in the roof ballroom of the Washington hotel, Wednesday morning, under the chairmanship of Judge J. J. Shea, of Tulsa, who has been one of the active leaders in the fight for reform in the taxation laws as affecting oil properties in behalf of the Mid-Continent Oil & Gas Association and the American Petroleum Institute.

A paper on "Oil Law" was read by J. A. Veasey, general counsel for the Carter Oil Company, and a paper on "Relation of Engineering Appraisals to Fair Market Value," by Ralph Arnold, petroleum engineer, who under the department of internal revenue formulated the rules and superintended the work of preparing valuations of the oil properties of the country for taxation.

Oil Supply Sufficient If Wildcatter Is Unrestricted

By Thomas A. O'Donnell

President, American Petroleum Institute

THE public has been frequently alarmed by statements of well-meaning and learned scientists predicting an early exhaustion of our petroleum resources.

There are many important petroleum deposits even within the boundaries of the United States that these men have not yet located or taken into their calculations. Petroleum is widely distributed thruout the world and, I believe, in sufficient quantities to meet the requirements, present and future, and if the economic law of supply and demand is given a free opportunity to assert itself, artificial, political and governmental restrictions are removed allowing everybody from everywhere to participate in the prospecting and production necessary, there will be plenty of oil to meet the requirements in all parts of the world for many generations to come.

An assurance, however, of stable property rights and private ownership is necessary to encourage the prospector with his vision of wealth to get busy.

A recent important and substantial discovery within the arctic circle of the North American continent, the known, but poorly developed, petroleum deposits in the southern end of the Argentine Republic, the development in Venezuela and Colombia in the eastern part of the South American continent, the development in Peru on the west, the oil deposits of Pennsylvania in this country and California on the Pacific Coast, brings to our attention the area within which petroleum development is possible on the western hemisphere.

There have also been sufficient discoveries of important petroleum deposits widely distributed in the eastern hemisphere, which would indicate to my mind that that part of the world also has like possibilities for development. There are vast areas in all parts of the world that have scarcely been scratched, which I believe have petroleum deposits equal to the developed areas of the United States.

Original development in all countries occurred in the vicinity of indications caused by exudes and seepages thru fractures overlying our petroleum deposits. Within the United States in the last few years some of the most important deposits in this country have been discovered, which were not indicated by seepages or otherwise. Important discoveries are continuing to occur in this country and, I believe, additional discoveries will be made long after the time limit set for exhaustion by some of our experts.

Each successful wild-catter means the discovery of a new deposit and an important addition to the known supply. The necessary wild-catting can only be secured by general belief in great profit in the event of success, an assurance of property rights and freedom from possible government interference.

There is a serious world-wide shortage of petroleum with which to meet the increased demand at the present time. During the last year we have continued to draw heavily on our accumulated stocks, already dangerously low after meeting the demands of the war. The present shortage has not been caused by any serious exhaustion of the petroleum deposits, but has been caused by extraordinary increased consumption. In the United States the production of petroleum has increased about 25 per cent in a little over a year.

The increased activity of the wildcatter has been caused by increased prices and restored confidence as to the future. A like increase has occurred in the Republic of Mexico, which has been largely due to increased confidence in the present government of that country and its possible attitude toward petroleum exploration of the future.

One of the troubles of the world, as I see it, during the last two years, is too much government everywhere. Too many doctors, too much preaching and too little attention to the practical experiences of the past, too much intellectual energy involving all kinds of visionary schemes for governmental effort to improve the conditions of humanity, all of which would probably be all right if it were not for the fact that humanity is what it is.

It may be regrettable, but I do not believe that the war has changed everything, and that we can start off on a new basis, but that any general improvement in the economic conditions of the world must be brought about slowly and along practical lines. Too many men in all parts of the world thru temporary government authority, or otherwise attracting attention, are advocating all kinds of impractical plans involving our industrial development who never produced anything in this line but a noise.

Agitation by government officials, statesmen or politicians is just as dangerous as governmental regulation and in interference. It destroys stability, credit and confidence as to the future. There is nothing we produce that needs the incentive of visions of wealth and the stability of property rights to a greater extent than petroleum. It is often said that nobody but an optimist continues to drill wild-cat wells. His chances of failure are great enough without adding the uncertainties of governmental interference.

The petroleum industry of the world needs no special legislation involving governmental restrictions or regulations. On the other hand, it needs no special

Agitation Injures Oil Production

Plenty of Crude For World's Needs

MR. O'DONNELL, speaking at the Thursday afternoon general session of the meeting, took an optimistic view of the crude oil problem of the world. He stated his belief emphatically that the supply will go on for many generations, meeting all world demands.

¶ The only danger to the maintenance of an adequate supply that he sees is in continuation of agitation fomented by foolish politicians and pseudo-scientists against the industry, restrictions placed on the oil man by the government, and barring the American oil man from development of foreign fields.

¶ Declaring that the discovery of important new fields will go on long after the time limit set by some of our scientific experts for the exhaustion of the world's petroleum supply, Mr. O'Donnell, in effect, says:

¶ "Assure the wildcatter of a good price for his oil, protection of his rights by the government and forbearance on the part of the government from harassing him by foolish and unnecessary restriction. Then let him alone and he will do the rest."

privileges nor governmental assistance, it is and should be subject to fair and general laws affecting commercial and industrial activities of the people. A general open-door policy and free opportunity to expand, government protection of property rights, where honestly acquired, and a fair and just cooperative spirit by government officials is all that is needed to secure ample production of petroleum to meet the requirements of the world.

Shortage on Pacific Coast

The greatest shortage of petroleum in any part of the United States at the present time is on the Pacific coast. There is no part of the world so dependent upon petroleum for its industrial development. All of the wheels of commerce are dependent upon petroleum for their power, including transportation on land and sea, heat and light for the people and even a large part of the extensive agricultural development on the Pacific coast is dependent upon petroleum to pump its irrigating waters.

Stocks have been reduced the last few years from nearly 60,000,000 barrels to about 20,000,000 at the present time. Stocks are dangerously low and there is little more than is necessary to keep in operation pipe lines, steamships and other petroleum transportation facilities.

The reduction in stocks so far this year has been nearly 8,000,000 barrels. With this dangerous condition confronting the people of the Pacific coast, the producer has had to contend with a most deplorable situation, the withdrawal of public lands, with active drilling in progress and many millions of dollars already invested, which brought about years of expensive and exhaustive litigation. A naval reserve was created on these lands two years after the development had started, and unjust public opinion created by constant publicity, promoting a general belief that the plutocratic oil producer of the west was trying to steal something from our navy. The producers of the Pacific coast feel that the Navy Department has not been fair with the producers of the west. We believe this to be due to the extreme prejudice of the head of the department. While an armistice has been signed with the Germans, no armistice has been offered to the oil producers by the Navy Department.

Field Can Be Extended

At Minneapolis, a short time ago, the ambassador of Great Britain is reported to have said: "America and Great Britain must avoid national trade competition organized by government and supported by political action." I heartily endorse the statement of the British ambassador. I believe it should be strictly applied to all the industrial development of both countries. The British ambassador is also reported as saying: "British trade policy is expressed in the five words—fair trade and equal opportunity." Again I heartily agree with him and hope that it is strictly applied to the petroleum industry, both in this country, Great Britain and other countries.

In the petroleum industry in this country the British citizen, so far as our government is concerned, has always enjoyed "fair trade and equal opportunity." If the American citizen can secure the privileges of "fair trade and equal opportunity" in all of the countries under the political control of Great Britain in the development of its petroleum resources, then they have secured all the privileges they are entitled to and the result of their efforts, if extensive in the development of petroleum resources, will be of greater importance to the British Empire than to the United States government.

The petroleum industry of America needs no special privileges at home or abroad, and the petroleum industry of Great Britain needs no special privileges either at home or abroad, and if both countries will apply that principle strictly in the future, it will never result in friction between the two countries. It will promote production, which would be in the interest of humanity.

No matter what the rest of the world did in this respect, I would still advocate an open-door and equal opportunity in the petroleum industry of this country.

Government Work Harmful

I believe government participation, either by Great Britain or this country, would retard rather than promote the development of petroleum resources. Many parts of the British Empire, as well as many other governments, have at the present time restrictive laws, denying an equal opportunity to foreign citizens to participate in the development of their petroleum resources.

Such legislative restrictions are not in the interest of active development, and it is just as important, if not more so, to the citizens of Great Britain to repeal such legislation as it is for Americans desirous of engaging in said development.

There has been a great deal of agitation in the United States in the name of conservation for state and national regulation to prevent waste; there have been many ridiculous statements made by men connected with government departments and other scientists as to the enormous waste which has occurred in the petroleum industry because of the lack of regulation.

While in England recently I heard the argument used in favor of government regulation; that the enormous waste in the petroleum industry in America should not be permitted to occur in England. The frequent statements by young scientists offering their services to the state and the nation to prevent waste, would lead the public to believe that the principal profit derived from the petroleum industry consisted in the volume of waste obtainable. Exaggerated statements and agitation along this line are not in the interest of oil conservation and the development of the petroleum industry for the people of this country.

Well-meaning scientists, calling attention to possible improvement in appliances for the consumption of petroleum, have frequently erred by presenting figures which would lead the public to believe that millions of barrels were being wasted every month, which was immediately preventable if their suggestions were applied. The public is not informed at the same time that if the equipment suggested was practical, it would take fifteen or twenty years to manufacture it and have it universally adopted.

I have always resented the statements that the development of the petroleum industry of America has been unnecessarily wasteful. I do not think that the petroleum industry, as a whole, has anything to apologize for along this line.

Of course, there have been improvements in methods, production, manufacturing and consumption. There is no doubt practicable economic development and use of our petroleum resources will bring about increased economy and usefulness, and the thoughts of thousands engaged in the business and conscientious study of the problems by scientists will bring about improvement as it has in the past. I am convinced that a greater part of our existing and proposed state legislation and national bureaus cannot bring this about if private enterprise and initiative are destroyed.

As Americans, stop apologizing for the petroleum industry in the name of conservation. Continue to conserve and develop as we have, along proper economic lines and the greatest good for all the people will then be accomplished.

No Fear for Future

In conclusion, let me say I have no apprehensions as to the future petroleum supply of either this country or the world at large, and the danger now confronting us, which is really serious, is not caused by exhaustion, but is likely to occur thru the foolishness of men in permitting restrictions caused by too much government.

In addition to our known petroleum deposits and the new discoveries, that are sure to occur, we have enormous shale deposits in the western part of the United States as a reserve in case of need, but a proper active development thruout the world will produce our petroleum requirements so much cheaper than is possible to operate the shale beds, that I do not anticipate any important development in the shale during this generation.

In the national interests, in the interest of the petroleum industry in this country, and in the interest of the people of the world, we ask our own government for no special privileges anywhere, but we do ask for a friendly cooperative spirit by our government in the interest of American citizens and American capital engaged in the development of the petroleum industry abroad. We ask for no financial assistance by our government except to use all proper means to stabilize and protect property rights where honestly acquired.

The petroleum industry of this country has the necessary talent, energy, resources, and will to take an active part in the development of this very essential product which would be in the interest of all people everywhere.

At home, for a healthy full development, the petroleum industry needs a friendly, fair and cooperative spirit on the part of our governmental departments. It needs a fair and just public opinion. On its part, it must conduct itself in a conservative and proper manner, obey the spirit as well as the letter of the general laws regulating our industrial life. It must give the public a square deal.

If the American Petroleum Institute can assist in bringing this about, it will perform a public service in the interest of all the people as well as of the petroleum industry.

Refiners Can Get "Dope" From Oil To Obviate Motor Knock

By C. F. Kettering

Research Head, General Motors Company

THERE are about two or three real fundamental problems that the automotive industry is facing. Number 1 is the fact that as the gravity goes down, or the end-point goes up, we have more difficulty in vaporizing the fuel, which I think we can prove has not anything to do with the burning side of it, but it has a lot to do with getting the proper distribution in the cylinders.

In other words, as the stuff is atomized it condenses on the sides of those manifolds and it naturally runs along the edges and the cylinders at the end will get more than those in the middle, where it is taken off the open manifold. So we have the question of distribution. That is helped out by heating the manifolds, but not to the extent you think. So the first big problem we have in the design of motors today is the question of distribution.

Now we realize just as well as you do that to raise the gravity of fuel up to where it used to be would not be economical from a good many standpoints. So there is a common ground in there where we can find a place that the distribution can be worked out satisfactorily. We have not exhausted all of our resources in the automotive industry yet on that subject.

Crank Case Dilution

Following that comes another difficulty which is not generally known and which causes an immense amount of trouble, and that is the fact that the non-volatized fuel which goes into the cylinder passes the piston ring, and we have what is known as crank case dilution.

We have had some very learned men in the oil business who have said there is no such thing as crank case dilution. Of course, that settles it. But nevertheless, we have it.

That is really a serious question, and the oil fellows say that it is because you don't make the fits of your pistons and cylinders, and so on; part of which is true and part of which is not, because the best engines we make still have a lot of crank case dilution.

There are a few things that we have got to get to the public; and those are the things that the public ought to understand—why they have crank-case dilution, and it is up to the automotive industry and you to fix it by telling them in a simple way so that they can understand it. If people understood the real fuel problems and the real difficulties today we could get them to do the things which are essential to overcoming those difficulties to a certain degree.

Now all they do is to cuss you fellows out for selling them bad fuel and blame us a little for not making our automobiles any too good. There is some truth in both of those accusations.

Those two problems are problems which have to do with the end point or the volatility side of the fuel.

There is another thing which has happened which has to do with the production. You know, I thought this afternoon as I listened to these men talk and assure us in their optimistic way about the wonderful supply of the future—and they were all trusting to the Lord to get it for them—and that is the thing that worried me, because I know a lot of them, and that is the first time I ever heard them do that.

So I thought it was getting pretty bad, that the only thing they talked of in conection with the oil business was consumption. Production was all right; it was the consumption that was wrong. We were getting the production all right, but we were using too much of it.

As you lower your gravity and as you raise your end points you are forcing the motor builder to lower his compression. As you force him to lower his compression the demand for fuel goes up because his motors run more inefficiently; and the more inefficiently they run the more fuel he needs, and the more you have got to raise the end points and the more he has got to lower his compression. It is just a question of time; that is all.

Molecular Structure

If we ever hope to solve this problem we have got to recognize that we are not interested in the millions of barrels of fuel produced per day, but we are interested a little bit in a much smaller thing than that, and that is the molecular structure of the thing and what we can do to help in that very important matter.

I do not believe that there have been many serious thoughts given to the question of the adaptability of our present fuels to the gas engine. It came in as a by-product, and it has been a buy-product ever since—and we have done the buying.

With all due respect to the fact that your president took several very indirect slaps at the scientific side of things, if there is any one thing that is lacking in the petroleum industry today it is a little bit of intelligent science.

This organization, I think, is the first body in the history of the world that has made it possible for the automotive industry to talk about the fuel end of the matter. So that this is really a constructive meeting because it brings together these two wonderful industries.

Fuel Question Serious

Today the fuel question abroad is a most serious one. In this country the fuel question has been more or less serious. On account of traffic conditions last year the coal question became serious, and we only realized to what a tremendous extent civilization depends upon horsepower.

There is not any amount of money—because the total amount to be expended would be insignificant compared to the magnificent figures that were given here this afternoon — not any amount of money which the automotive industry can expend or which the American Petroleum Institute can expend in solving these apparently elementary problems that are applied to the internal combustion engine, but what the fruits of research work will be many, many fold.

Now, we have it on good authority that if we took 10 per cent of the heavier ends out of our fuel today, we could run even more economically than we do now; but we have got to reverse this very interesting fact, that as we lower the compression of an engine we lower the efficiency of it.

Now, in order to get to you this problem as we see it, here is what happens:

If we try to burn the present-day fuel which is sold at the average filling station in a high-compression engine, we will say, like an airplane engine, we cannot do it. We cannot fly. The reason for it is that we get that awful knocking in the motor..

High Compression Would Help

Now, if we can put the maximum compression up to a point of, say, 120 or 130, or even 140 pounds, and not have it knock, not have it break the engine up, then we can practically double the efficiency of our engines around 20 to 30 miles an hour. It is possible, by a cooperation between this organization and the automotive industry, to increase the efficiency of our machines from 33 1/3 to 50 per cent.

Each particular fuel has its characteristics. The paraffins have theirs. The citrate compounds, like you get out in California, have theirs. You know, there is a wonderful illustration. Out in California there have been more kerosene carburetors invented than in any other place in the world, because they take that 27-plus oil, as they call it, out there, that black oil, and put it in a carbureter and it runs wonderfully out there. Then they bring it down here, and we put some of our paraffin kerosene in it and the engine just hammers its head off. The fellow thinks his carbureter is out of adjustment, but I want to explain to you how little this is understood.

A motor-car builder in Detroit built a new motor-car last year, an experimental car, and sent his boys across the continent with it, and in going across the continent the engine just pounded its head off. When they got out to Denver they wired back that the machine was in terrible shape, that it would never do; it has just pounded, pounded, pounded. So he hopped on

a train and met them in California and they could not get it to pound out there at all, so he said: "You fellows have been drinking. That is all there is to it."

Engine Pounds to Pieces

So he got on the train and came back, and the boys drove the car back across the country, and after they got it past the Rocky Mountains, coming back, the engine just pounded its head off again. They burned out bearings, and they had a devil of a time getting home. I am telling you that because I want you to appreciate that the automotive engineer today does not understand the fact that there are different characteristics in different kinds of fuel.

If you can raise the compression of your motors, you can do a lot of things. You can increase the economy; you can do things to keep out crank-case dilution; you can do things for distribution; you can do a lot of things that we cannot do now. But it is such a big task because of the fact that we cannot do the things that we want to do in the automobile engine until we get the proper fuel work done, and we have difficulty in getting the fuel work done until we get the engine to do it. So we have got to carry this movement on together as a coordination between the Petroleum Institute, the automotive industry, and the chemical societies, because it is possible, and we know enough today in a good many ways to help this situation out.

Now, what we want in the automotive industry is this: We want a fuel and a lubricating oil which you can put in an internal combustion engine that will give very good efficiency and run forever and never have to clean the carbon out of the engine. That is what we wish for, and I believe that with the right kind of cooperation between these organizations that thing can be attained, and attained rather quickly.

If you were to take carbon deposits out of an engine and analyze them, you would find that they are made up roughly, of three things: First, a very low hydrocarbon, away down, a small molecule. You will find some free carbon in there, and then you will find about 5 or 10 per cent of a carbon-oxygen-hydrogen mixture, which is nothing but a varnish, and acts exactly like varnish. If, now, you dissolve out of that carbon deposit that 5 or 10 per cent of binder, then the rest of it all goes out, and you do not have any trouble with carbon.

Refiners Can Get It

It is possible to go back and get such products in your refining process. You can either make them and put them in your fuel, or you can make them and sell them separately. You may get more if you sell them separately.

We tried a good many things. The first time that we got any reaction at all that was worth while was when we mixed a small amount of iodine with the fuel. We were using kerosene on rather a high-compression engine, because it was very easy to get the fuel knock with the kerosene—simply a question of raising the temperature of the engine. We found out that when we added a little iodine in there, immediately the knock went down and the power went up, and the engine got perfectly happy.

Naturally, we fabricated some very wonderful scientific theories as to what happened. We do not know whether any of them are right or not, but it does not make any difference. The iodine always does the same trick every time you try it.

Now, the thing we need and the thing we have got to jointly work to get is these dopes and get them on the market. In a great many ways they can be used, and I think every man who is interested in the petroleum industry should drive the fuel that he sells at his filling stations, because I don't believe you will ever get a comprehension of what the average driver out in the small town has to contend with unless you do.

Now I am going to analyze this thing in a very simple form so I think you will get the point. There are but very few difficult problems. First is the question of volatilization, which I think can be worked out by the ordinary mechanical means, by the application of heat. Then we have the starting problem, which is quite a serious one, and I think we will have to resort to having you gentlemen put on the market a highly volatile stuff like petroleum ether, or something of that sort, that we can use with a little can and a little primer that doesn't cost much and which you can charge five dollars for to the consumer, so you can prime this engine with a little high volatile stuff.

Your engine will shoot, and it only takes a few shots to take the chill off the motor, and then your heat applications come on and the thing does pretty well. That will handle the question today so far as the use part is concerned. But the big thing we have to get to is the increase in economy.

In other words, we have got to do more work for the amount of energy that is in the gallon of petroleum products.

Attention, Chemists, To Thermometer Tale

Staff Special

WASHINGTON, Nov. 19.—C. J. Tagliabue, who, with his pal, George M. Saybolt, was a pleased and interested visitor at the meeting of the American Petroleum Institute, told a story while in the city that is herewith passed on to those chemists and others who are working to establish standard tests of oil products to eliminate friction over specifications, as having significant possibilities.

A friend of Mr. Tagliabue's in Brooklyn (so the story ran) operated a theater. One day he ordered from Mr. Tagliabue a dozen thermometers to be put up in the theater. The psychological effect on people of looking at thermometers and immediately feeling too warm or too cold, according as the thermometer indicated the temperature was discussed.

When the theater proprietor had gone, a way occurred to Mr. Tagliabue to plan a joke on his friend and also on the people who regulated their feelings by the thermometer. So he made and delivered a dozen dummy thermometors. They had no bulbs and the stems were filled with red liquid up to the figure 70 on the scale.

To prevent possible skeptics from exploring for the bulb or lighting matches under it, Mr. Tagliabue housed the ends where the bulbs should be in strong wooden cases. The thermometers were hung about the theater and the effect was immediate. Shivering patrons, looking at the trick instruments and finding that they registered 70, forgot their chills and beamed with warmth supplied by their own mental reaction.

Then Mr. Tagliabue told the joke.

It is suggested that if the oil buyer and the seller were each equipped with a thermometer registering the temperature which the buyer wanted and the seller claimed his product to meet for certain tests—but why say more.

Fuel Losses Occurring In Field, At Refinery

Staff Special

WASHINGTON, Nov. 20. — The work the government technical bureaus and some industrial companies have been doing in studying the efficient utilization of oil and gas consumed by the oil companies themselves in drilling and production work and in refinery operation was the subject of a group meeting held Wednesday and Thursday mornings, presided over by O. P. Hood, of the Bureau of Mines staff.

The economies that can be brought about by using most efficient types of burners for both oil and gas and investigating the conditions under which they should operate, by the insulation of boilers, and by the proper design of fire boxes, was taken up in a paper on "Fuel Wastes in Drilling and Production," by A. W. Ambrose, petroleum technologist of the Bureau of Mines. He pointed out the losses due to the fact boilers are often used in the oil fields without any protection from the weather, and stated that the design and construction of fireboxes should be such as to allow the introduction of low pressure burners in certain cases.

John B. Corrin, of the Hope Natural Gas Company, Pittsburgh, speaking on the subject of "Fuel Saving in Well Drilling," showed the means his companies have adopted to cut down the waste of gas used in drilling operations. He said that, instead of a flat rate, gas was metered and charged for and the amount was reduced from 120,000 cubic feet a day to about 45,000 cubic feet. Further improvement, he said, was made by the introduction of gas engines and improved practices which in some cases reduced the gas consumption to 7,000 or 8,000 cubic feet per day.

Henry Kriesinger, of the Bureau of Mines, telling of co-operative experiments made by that bureau with the Sinclair Oil & Gas Company, showed how they had been able to increase the capacity of their refinery stills and at the same time reduce their fuel requirements by making a careful investigation of existing conditions to secure a complete heat balance.

On the subject also of heat losses in refinery operation, Charles J. Parsons, of the Celite Products Company, New York, read a paper on "Insulation of Oil Refinery Equipment."

Life Of American Merchant Marine Depends On Oil Supply

By Admiral W. S. Benson
Chairman, U. S. Shipping Board

FOR the reason that conditions are changing so rapidly in the privately owned American shipping, accurate data are not available as to the fuel oil requirements of such shipping, and I have taken the liberty of interpreting the subject which I have been asked to discuss this evening, as "The Demands of the Shipping Board for Oil."

I find that comparatively little is generally known of our enormous requirements of fuel oil and believe that a brief resume of the efforts of the Shipping Board to purchase its fuel oil requirements and of the problems which have confronted us in this respect during recent years, is essential to full appreciation of the extent to which the interests of the Shipping Board and of the American petroleum industry are interwoven.

For the year 1919 our requirements of fuel oil amounted to approximately 18,000,000 barrels; for the year 1920, 30,000,000 barrels, and for the year 1921 we estimate our requirements will amount to approximately 40,000,000 barrels. Our first fuel oil contracts were made to cover the period from April, 1919, to April, 1920, and amounted to 12,000,000 barrels. The contracts covered the principal Gulf and north Atlantic ports and ranged in price from 74 cents to $1.15 per barrel. The balance of our requirements was purchased in the open market at from 75 to 100 per cent in excess of the contract prices.

During the early months of 1920 our fuel oil contractors experienced great difficulty in supplying the contract quantities of fuel oil which was also very scarce in the open market, our contractors reporting that this was due to unsettled political conditions in Mexico and shortage of tank steamers. In the face of these conditions our failure to receive acceptable bids in February, 1920, was to be expected. However, we succeeded during March, 1920, in contracting for our requirements of fuel oil at the principal North Atlantic and Gulf coast ports for a six months' period, at prices ranging from $1.34 per barrel to $2.07 per barrel, an increase of over 100 per cent as compared with our 1919 contracts.

We have recently contracted to purchase over 30,000,000 barrels of fuel oil during the period October, 1920, to October, 1921; on the Atlantic and Gulf Coast, at prices ranging from $1.50 to $2.30 per barrel. We have never been successful in our efforts to contract for our fuel oil requirements on the Pacific Coast, but, by virtue of our agreement to purchase from the United States Department of the Interior all of the government's royalty crude oil in the states of Wyoming and California, we have been enabled to secure our requirements of fuel oil on the Pacific Coast since June, 1920, in exchange for the royalty oil from the Salt Creek, Wyoming fields. It is the board's intention to conclude similar arrangements with respect to the royalty oil in California. With reference to our fuel oil requirements in the Pacific, you may be interested to know that of the 144 Shipping Board vessels operating from the Pacific Coast ports, only one burns coal as fuel.

The Shipping Board, tho rather late in launching its foreign bunker station program, has diligently pursued the policy of creating fuel oil bunker stations at strategic ports on established trade routes. In October, 1919, we completed our first foreign bunker station on Hassel Island, St. Thomas, V. I.

This station has a storage capacity of 110,000 barrels and will shortly be increased to 220,000 barrels. The board has also constructed fuel oil stations at Honolulu, which have a storage capacity of 110,000 barrels, and at Manila, which has a storage capacity of 165,000 barrels, and also provided floating storage at Ponta Delgada, Azores, for 22,000 barrels of fuel oil. In addition to these stations, we have contracted with various oil companies to receive, store and re-deliver fuel oil for our account at Shanghai, Iquique, Rio de Janeiro, Bizerta, Brest, Genoa, Savona and Hamburg. These stations are supplied with fuel oil purchased under our contracts, and transported in Shipping Board tank steamers, and their creation has enabled the board to supply 75 per cent of its foreign fuel oil requirements at a saving of millions of dollars per annum. The establishment of these stations has in each instance had the effect of reducing the price of fuel oil on the open market to a marked degree, thereby benefiting shipping in general.

We have for over a year suffered seriously from the effects of insufficient tank steamers with which to transport our constantly increasing requirements of fuel oil and the tank steamer fleets of the established oil companies were totally inadequate to meet the demand.

A large number of our tank steamers in order to keep them fully employed were chartered to private companies before the growing demands of the merchant marine created such a shortage in tank steamers and they were thus beyond our control during a considerable period.

This condition, I am glad to say, has been rapidly corrected and early in the year 1921 we will have at our command sufficient tank steamers to enable us to expand our bunker station program and eliminate the purchase of oil on the open market, which will result in further enormous savings.

Lubricating oils also play an important part in ship operation and our re-

144 Ships And Only One Burns Coal

Asks Institute's Aid for Shipping Board

ADMIRAL BENSON, speaking at the Thursday evening general session, told the oil men that upon an assured supply of oil at a reasonable price depends the successful operation of the American merchant marine.

¶He said that the Shipping Board's fleet is meeting the keenest of competition on the seas by nations accustomed to shipping for generations and versed in every phase and trick of ship operation.

¶The American fleet has the advantage of them at present, the admiral said, because of the fact that 75 per cent of its tonnage is oil burning, while only 15 per cent of the foreign fleets' vessels are equipped for oil fuel.

¶The only way in which the advantage can be maintained, he said, is thru the shipping board being assured of fuel supplies. Admiral Benson reported that the board is going ahead steadily with its program for establishing oil bunkering stations at strategic points on the ocean routes of the world.

quirements of this product now amount to approximately 4,000,000 gallons per annum. Our first contracts for lubricating oils were made in October, 1919, for all domestic ports for one year, at prices substantially 50 per cent below the prevailing market and we have recently executed contracts for another year.

I have discussed this matter in considerable detail, desiring that you leaders in the American petroleum industry should have an intimate knowledge of our requirements and the policy which we are pursuing to secure the necessary supplies of fuel oil and lubricating oils, in the hope and belief that we may have your sympathetic cooperation to the end that our efforts to upbuild the American Merchant Marine may be lastingly successful.

In conclusion, may I impress upon you with all the earnestness at my command that we are now facing the most unrelenting and stifling competition of nations trained in all the fine points of ship operation. One of our greatest advantages lies in the fact that about 75 per cent of our entire fleet burns oil for fuel, as compared with about 15 per cent for all foreign shipping. This advantage cannot be realized to the fullest extent unless the Shipping Board and the American Merchant Marine as a whole can be assured of an adequate supply of fuel oil not only now, but of more importance, in the future as well, at reasonable prices. To this end, I have no hesitancy in appealing for a continuance of that support which the American petroleum industry has so patriotically tendered in the past.

R.R. Representative Asks Co-Operation From Shippers Of Petroleum Products

By Special Correspondent

WASHINGTON, Nov. 20. — The most unusual if not unique kind of group meeting ever held in connection with any general assembling of the oil industry was that in the Gridiron room of the New Willard, Wednesday morning, November 17, immediately after the first general session of the institute. The group consisted of the transportation men of the industry, presidents and other officials of pipe lines, tank steamers and tank car lines, and traffic managers of companies not to be classified among any of the transportation subsidiaries.

It is believed to have been the first gathering of the men whose first interest is to get the products of wells and refineries transported. M. J. Gormley, head of the transportation department of the institute, was the presiding officer. Only one session was held.

Not a word was said about rates, either as rates or parts of the general adjustment. It was not a rate meeting. Transportation in the sense of getting the goods to market was the topic. The money paid for the service was not intended to be brought for ward for discussion. The industry is not agreed on several phases of the subject. Nothing would have been gained had the subject of rates and adjustment been brought forward. Everybody was interested in the problem of how to keep the tank car moving—to give it no rest, as suggested by A. M. Schoyer, manager of the thru freight business of the Pennsylvania system, one of the principal speakers at the group meeting.

Mr. Gormley welcomed those in attendance, suggesting that they know about the problems with which each had had to deal in trying to do the thing that Mr. Schoyer suggested.

Plain speaking and much more of it than has been the fact, Mr. Schoyer indicated, is what is needed in the dealings of the railroad men and the traffic managers of the industry, with each other.

"The day of the man with the hammer is gone," said Mr. Shoyer; "so also the day of the man always in favor of using the soft pedal. The problems confronting us are not to be solved by the man who uses the hammer, nor by the man of the other method. The watchword for the railroad man and the shipper henceforth must be cooperation.

"Criticize us freely, but not too freely; to our faces and not behind our backs," said Mr. Schoyer, smiling at the men, many of whom, like Mr. Gormley, were formerly railroad men and therefore have knowledge of both sides of the question.

"Whatever success you have had during the last two or three years in getting the tank car to move faster, has been due in large measure to the consolidation of shipments so as to offer the railroads either solid trainloads, or large blocks of cars to be made the principal part of trains when they leave division points.

"If you could make the blocks a little larger," said Schoyer, "you would probably find that many railroads would forward the blocks as trains instead of seeking to fill up cars to make the tonnage moving large enough for a modern locomotive. Twenty-five cars is not much of a bite for a modern locomotive.

"We owe each other friendly criticism. We owe it to each other to point out what we think are faults. If we know about a bruised spot as soon as it develops it may be cured, while if it is allowed to continue until it becomes a cancer its cure may be impossible.

"We need more information about each other. A short time ago a train of oil was to be moved. Seventeen men were notified but the two who could have done something to expedite it were not. The seventeen who received the notice wrote to somebody else and the latter continued the correspondence but the right men did not hear much about the train. The railroads are doing something in the way of check passing reports to keep in closer touch with the movement of tank and other kinds of cars. The car record offices are not and connot be in close enough touch.

"We have been thinking about a method for apprising train conductors and yard masters about the importance of keeping the tank car moving. There should be no rest for it. The method consists of a large envelope with car numbers on the outside and the bills inside. The idea is that when a yardmaster or conductor is given that envelope he knows that the cars mentioned in the form on the outside must not be delayed except for bad order.

"Oftentimes nowadays when a yardmaster knows that a train has come into his yard with more cars than can be hauled over the next division he chops off the last forty cars of a train and then, after the operation is completed, he finds there are tank cars in the part that has been cut off that should not have been taken out of the train. From that time forward the detached cars keep wandering around, whereas, if the yardmaster had had something to tell him at a glance that certain of the cars in that train must not be taken out to lighten it for the division over which it is about to pass, he would not have detached them.

"The remedy for the deficiencies is not more tank cars, but a more efficient use of the cars you already have. This country is well supplied with cars for the business to be done. I don't believe you men want to flood the country with tank cars. It is somebody's duty to spur up the railroads so as to keep the cars moving. We all know the difficulties the railroads have had with green men in the yards and with green men in the shops. The quality of the labor is improving but the turnover in the New York terminal has simply been enormous.

"The facilities of the railroads in the way of yards are not such as to invite the use of many more cars. More efficient use of the tank cars we have is more to the point. Nor do I believe that light tonnage trains running at high speed are desirable. I don't believe you men want your tank cars run at excessive rates of speed in light trains. The solid train, the principle of which is as old as the hills, if not older, is the best solution suggested. It came out of the northwestern region from which Mr. Gormley came and we were glad to adopt the suggestion."

Mr. Gormley said that statistics put out by the Interstate Commerce Commission recently showed that in the first three months of 1920, the railroads of the country transported 284,000 tank cars of oil, 223,000 cars of corn and wheat, and 568,000 cars of animal products, but the cars containing animal products carried 1,500,000 fewer pounds of freight than was carried in the smaller number of petroleum tank cars.

"In a revenue sense then," suggested Mr. Gormley, "one tank car of oil is as desirable as three of animal products. Of course, the advantages accruing to the railroads of being able to move packing house products in trainloads is not to be overlooked, but I believe the suggestion of Mr. Schoyer that the oil traffic is one worth cultivating is a sound one."

Tank cars was the subject of a paper written for the transoprtation group meeting, by Max Epstein, of the General Tank Car Corporation, but Mr. Epstein could not be present to read it

How Will Oil Industry Raise The Funds To Operate On Scale Demanded?

By Henry L. Doherty
President, Cities Service Company

THE oil business of this country is now, and has been for a long time, a highly competitive business; in fact too much so for the good of the public. We have another factor to reckon with and that is no small one. The oil business is no longer a local business. It is international. Here is an industry that, by right of discovery, development and conscientious work, is largely an American industry. The position acquired by the American oil man is now contested by the oil men of every other country.

Except for a listening attitude of our government in the last few months, if our government ever reached out to give any sort of a boost to the oil business, I never heard of it. Our largest and most powerful oil company, and the one that could contribute the most in maintaining American supremacy, was heaped with abuse until it was tarred with unfavorable public opinion and finally hamstrung by a court decision which largely emasculated it; while its big foreign rivals were left free to conduct themselves according to their own sweet will. While all foreign oil companies can depend upon at least the unqualified moral support of their governments, and in many cases the unlimited support of their governments even to the extent of furnishing them with government money to assist them, all that we can hope for is to try and keep from being hamstrung by our Government until we can make them appreciate what it means to the American public and our national pride to have our American oil companies maintain their position in the world's competition for oil.

I know of no industry today which faces the need for greater capital, and I know of no business where so little foundation has been laid for getting this capital, and in fact where so much harm has been done in poisoning the public mind as to the safety of oil investments by foolish and fraudulent enterprises almost entirely handled by rank outsiders to the business.

The matter of floating oil investment securities on the market in distinction to floating speculative oil securities was practically an unknown thing up to four or five years ago. In the early days the growth of the business was not so rapid and was largely taken care of by the reinvestment of profits. The usual vehicles of finance used by other lines of business, such as bonds, preferred stocks and debentures were almost unheard of in the oil business, and only in recent years have they been offered as a popular subscription to the public.

Where bonds, preferred stocks or debentures were used they were largely used in lieu of purchase money. While other lines of business have worked out not only the nature but the amount required for the various safety features required for bonds, this has all yet to be done in the oil business, except as we may here or there, suit the fancy of some single banking house. The matter of drawing sinking funds for bonds on oil properties, the amount and how it shall operate, the clauses relating to maintenance of property, the provisions under which additional bonds can be issued, and all matters of that sort are questions demanding future invention as to nature and determination as to amounts.

I will not attempt to say how these problems shall be solved as this is not the place to do it. I will, however, touch on one or two matters of details of finance just to see if it will not stir up some interest in the whole subject.

The banker is only interested as a rule in the particular issue he is going to buy, and you have to live with the property through this issue and every other issue.

All bonds and preferred stocks should have provision that the company may call and retire them at some fixed price, even though this looks like a high price to the company.

Whenever possible, the sinking fund should be drawn so it can be satisfied by additions to property rather than by the use of cash to retire bonds. The old form of sinking funds compels you to take up bonds at a premium from some satisfied holder who otherwise would not sell them and to sell other bonds at a discount to some fellow who must be convinced why he should buy them.

Property additions must often be made regardless of whether there is a bond market or not and it is a great hardship to both to make improvements without selling bonds and also to raise money for a sinking fund. The company can always give the bond holder the maximum protection if allowed to use a sinking fund which permits either the purchase of bonds for the sinking fund or the addition of property without increase in bond indebtedness. The amount of property to be added in lieu of a payment to the sinking fund is always more and often for each dollar withheld from the sinking fund it is required that two dollars be added in property.

Bond dealers are very apt to ask for all sorts of restrictions on the company to be written into the mortgage. You can determine how important these are by asking the dealer how much more he would pay for the bonds if you write in these restrictions. As a rule he will not pay one point higher for a whole bushel of these restrictions.

It has become more or less the fashion for bankers to recommend the use of a preferred stock as drastic on the company as a bond. In fact, so far as the company is concerned they have really made the pledges that would go into a bond. This sort of a stock never sells initially for as much as would a bond and never takes as high a value in the market as a bond would do of the same yield.

There are many people who will not buy a preferred stock but will buy a bond and those who will buy a preferred stock will buy it about as readily with an outstanding bond issue as without. To use a preferred stock and pledge yourself to issue no bonds will, generally speaking, reduce the number of people from whom you might get capital.

The tendency in the public utility business is toward a mortgage unlimited

Capital Requirements of Oil Business

Need for Public Investments

THERE is much food for solemn thought on the part of every oil man in the address of H. L. Doherty, of Henry L. Doherty & Company, on "The Future of the Oil Business." From all his experience in financing Mr. Doherty says he knows no business which faces greater need for additional capital than the oil industry and none where so little foundation has been laid for securing this additional capital.

The problem of the future, as he sees it, is not so much securing the necessary crude from the ground, but it is raising the vast sums in investments on the part of the public necessary for the business to carry on.

The value of all the crude produced in 1920 will be equal to one-fourth of the total value of the entire crude production of this country for all years prior to 1918. And still more oil is needed. Consider in addition the investment necessary in transportation, refining and marketing facilities.

"If the public demand for petroleum is to be met, the oil business must be left absolutely free and unrestricted in its entire competitive development, financial and otherwise," is his conclusion.

as to amount or date of payment or rate of interest. Bonds can be issued indefinitely for a fixed percentage of all new property; say $3,000 of bonds may be issued for $4,000 of additions in property. Bonds are issued in series, but with equal priority as to assets and for such period and such interest rate as seems best at the time of the issue. As one issue becomes due, bonds under the same mortgage with a later due date may be sold for the retirement of the maturing series. The sinking fund provides that cash may be used to buy outstanding bonds or property, but if property is added, then one and one-half or twice the amount of the sinking fund payment must be expanded. The oil business presents new difficulties in many ways, such as wasting assets on production properties and more or less indefinite costs of production and fluctuating and unknown market values for crude oil.

It is the purpose of this address in general to review what the capital demands of the petroleum industry have been, how they have been met and to point out, insofar as it is possible, what the future tendencies of the business are likely to be. No man is competent accurately to forecast the future in any business, least of all the petroleum business. He can only point out tendencies.

Other speakers have pointed out the fundamentals of the demand which, broadly speaking, has increased, in terms of the number of motor vehicles demands gasoline, from 700,000 in 1911, with a domestic crude oil supply of 220 millions of barrels, to no doubt 9,000,000 automobiles or more in the United States at the present moment, with a domestic crude oil production now running at the annual rate of 475 millions of barrels and with importations at the annual rate of about 150 millions of barrels. In other words the country is now absorbing oil at the aggregate annual rate of 625 millions of barrels.

In view of the readiness of the public to absorb this enormous quantity of oil, without a disturbance of the crude oil market in the midst of the present liquidation in many lines of business, the query therefore becomes pertinent whether there will not be in the near future an insistent public demand for oil for all purposes which will equal one billion of barrels per annum.

I therefore turn to an analysis of what the capital requirements of the business have been, and are likely to be under the tremendous economic forces which have been at work, being primarily an increased demand, increased production, and increased costs of labor and of capital.

Obviously, the ideal method of ascertaining the past capital requirements of the oil business would be to have on a single balance sheet a record of all of the money put into the business by investors, ranging all the way from investors placing money in the most conservative and strongest of oil companies to the "lunatic fringe" of oil "investors" who have bought merely full page advertisements of derricks spouting forth floods of oil, whose money in reality has gone merely into the pockets of unscruplous promoters, together with an analysis of capital investments out of surplus and of actual dividends taken from the business. Unfortunately no such statistics are available.

However, it has been possible to make an analysis of the fiscal operations of 250 representative companies whose annual reports are available, and also to glance at least at the capitalization—mostly water it is true—of new oil and gas companies, not including new financing by established concerns, as per annual and monthly reports published in financial journals. The former companies can well represent the very best that can be attained in the business, and the latter perhaps the worst.

Practically complete statistics are available for a group of 108 companies organized before 1912, being the so-called Standard group and the larger older "Independents," and a group of 142 companies organized after 1912, for which records are practically complete. This analysis shows, as near as it is possible to ascertain from the published records, that the capital invested in the business of these 250 representative companies as of December 31, 1919, amounted to $2,501,929,914. On December 31, 1911, those companies of the group referred to then in existence showed capital invested of $717,098,563.

Therefore the increase in capital invested by these companies for the period from 1912 to 1919 inclusive was $1,784,841,351.

The cash dividends paid by all of these companies in the years from 1912 to 1919 inclusive amounted to $906,262,272.

Therefore, the actual excess of new capital flowing into the business over dividends actually paid out of it during the period from 1912 to 1919 inclusive was $878,579,079.

In other words, the requirements of capital of the business from outside investors, as indicated by the operations of these companies, during the period under review were almost twice the amount of the earnings paid out as dividends during the same period.

The foregoing figures take no account of surplus re-invested in the business, but it is probably true that the re-investment of surplus on the part of this great group of companies would fall considerably below the increase in capital invested in the business by the purchasers of oil securities.

It may not be amiss also to point out that these companies during the period paid taxes aggregating $337,737,933, or more than one-third of the amount of the dividends.

An analysis, however, of these two groups, segregating them into companies organized before 1912 and those organized after 1912, is even more illuminating than the foregoing to show how enormous have been the capital requirements of the oil industry, and how the problem of the new companies has been to get oil, i. e., increased production for the public and increased value for their stockholders, rather than to disburse dividends from a growing business.

The capital stock outstanding of the first group in 1912 was $682,632,909, and in 1920 was $1,341,261,560, or an increase of $658,628,651. Of this amount $184,915,249 was stock dividends, and $473,317,402 represents stock issued for cash or property, which together with outstanding bonds indicated new capital entering the business through these companies of $537,601,799.

The dividends paid by these companies during the period was $788,270,143, and taxes $300,708,101.

Doubtless it was the lure of the profits in dividends and of increases in the value of stock of these great concerns which drew the enormous volume of capital used by these companies organized after 1912 into the oil business; and in this group the stock outstanding at December 31, 1919, was $1,160,678,354 of which $19,161,623 represented stock dividends, thus leaving a balance of $1,141,516,731 of stock issued for cash or property, which, added to $105,722,821 bonds issued for cash and property indicated new capital entering the business of $1,247,239,552.

This group of companies, constituting as a whole the strongest possible sort of competition with the group in existence before 1912, has found the capital requirements of the oil industry to be so insistent, owing to the continual expansion of the business, that it has been able to pay to its stockholders during the entire period only the sum of $117,992,129. That this great group of companies eventually will yield a larger return to its shareholders I have no doubt; but there are many strong Independent petroleum companies, whose assets are very large, whose dividends during the entire period have been negligible because the insistent demands for capital must be met first by

Work Of The Institute Discussed By Welch

Staff Special

WASHINGTON, Nov. 20.—At the only session of the convention approaching a business meeting of the institute membership generally, that was held Friday morning, Secretary Welch outlined the work of his staff the past year, asking for questions from the membership on any part of the work.

In his talk Welch brought out that the directors of the institute have not yet settled the matter as to whether or not the institute is to call a general meeting of its membership to hold a forum to decide what action if any it should take in reference to working toward a modification of the August 25th advance in freight rates on petroleum.

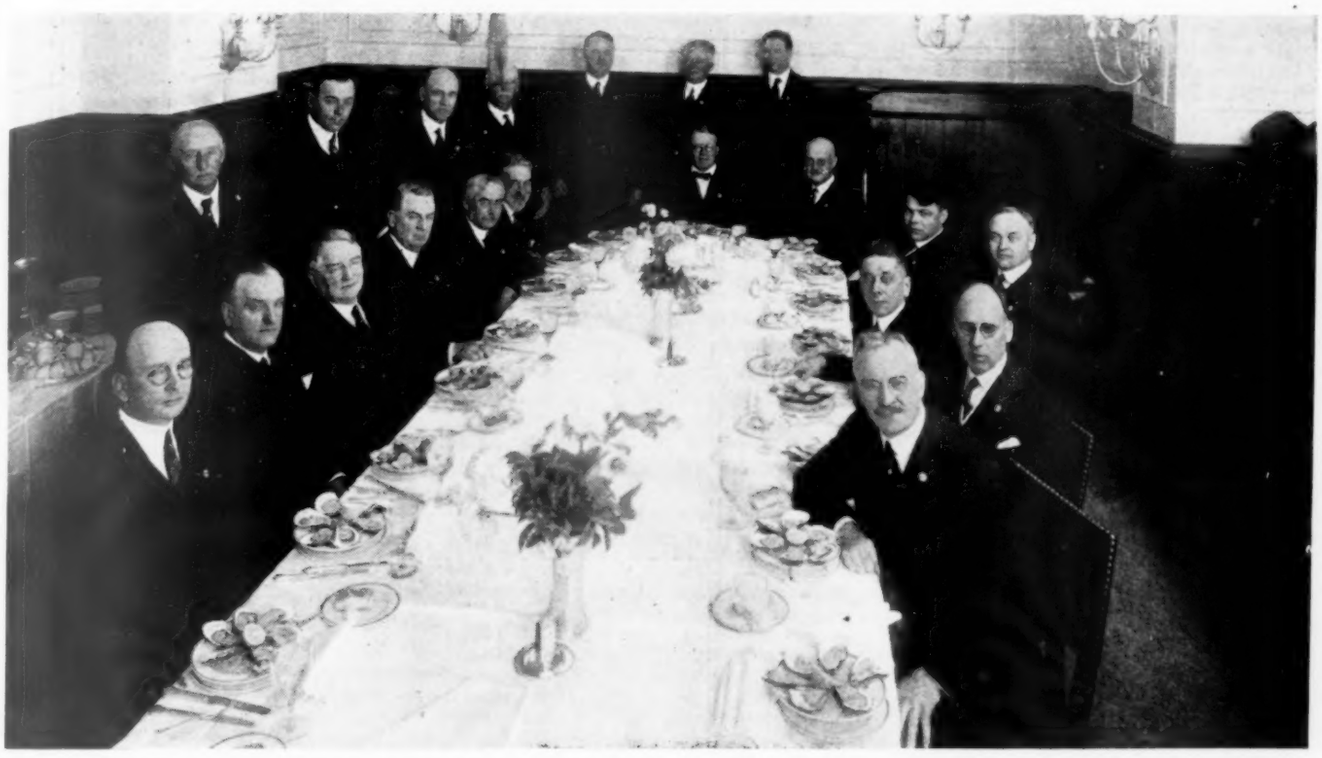
He stated he believed the institute would be making a great mistake if it closed its doors to a discussion of commercial problems of this character.

Welch went over the work of the institute staff as it related to matters coming up thru the shortage of petroleum products as against demand which made itself felt the early part of this year, and matters in connection with the fiscal operations of the oil companies.

On the subject of investigations of the oil business by the government, state bodies or from whatever source they might arise, he stated the industry ought to welcome each proposed probe as a chance for it to put the true facts in the case before the public and that it ought to offer all possible aid to the investigating body rather than in any way hinder its efforts.

The remarks of Secretary Welch amplified, as he may see fit, will be issued in full to its membership by the institute later.

Directors Of American Petroleum Institute In Session



Standing, left to right—Edward Prizer, president Vacuum Oil Company; W. C. Teagle, president Standard Oil Company of New Jersey; M. L. Requa, vice president Sinclair Consolidated Oil Corporation; J. C. Donnell, president Ohio Oil Company; Colonel R. W. Stewart, chairman of the board, Standard Oil Company of Indiana; George W. Crawford, president Ohio Fuel Supply Company; R. L. Welch, general secretary and counsel, American Petroleum Institute.

Sitting, left to right—W. S. Farish, Humble Oil & Refining Company; Dr. Van H. Manning, American Petroleum Institute; J. W. Van Dyke, president Atlantic Refining Company; J. E. O'Neill, president Prairie Oil & Gas Company; R. D. Benson, president Tidewater Oil Company; Henry L. Doherty, H. L. Doherty & Company; Thomas A. O'Donnell, president American Petroleum Institute; Judge C. D. Chamberlin, general counsel National Petroleum Association; F. W. Lehmann, Jr., secretary Western Petroleum Refiners' Association; C. L. Maguire, Maguire Petroleum Company; G. I. Sweney, president Bartles-Sweney Oil Company; A. P. Coombe, Standard Oil Company of Ohio; M. J. Byrne, Connecticut Oil Company.

these companies. Sound business principles have required that every dollar that could be made should be immediately placed back in the business if the demand of the public for petroleum and its products was to be met and proper business principles were to be observed by the companies.

Although the primary purpose of this address is to bring out the present and future capital requirements of the business, it is not amiss to call attention here to the fact that the public—which after all is primarily interested in production—has obtained its petroleum supplies under conditions in which a negligible amount of money has been taken from the business in comparison with the amount invested therein.

Returning, however, to the main theme—the capital necessities of the business—it will be interesting to analyze the dividends paid and the increases in capital stock by years and the results indicate a constantly increasing demand for capital.

On January 1, 1912, capital stock outstanding was $82,632,909. The dividends paid during the year were $64,429,397, (8.43 per cent) and the increase in capital stock outstanding was $81,108,878.

In 1913 the capital stock outstanding was $885,052,410, the dividends $93,131,941, (10.52 per cent) and the increase in stock outstanding was $121,310,623.

In 1914 the capital stock outstanding was $999,921,643, the dividends $74,947,191, (7.49 per cent) and the increase in stock outstanding was $114,869,233.

In 1915 the capital stock outstanding was $1,057,354,913, the dividends $78,443,302, (7.41 per cent) and the increase in stock outstanding was $67,433,270.

In 1916 the capital stock outstanding was $1,329,668,293, the dividends $120,568,950, (9.06 per cent) and the increase in stock outstanding was $272,313,380.

In 1917 the capital stock outstanding was $1,662,307,526, the dividends $149,768,818, (9.01 per cent) and the increase in stock outstanding was $332,639,233.

In 1918 the capital stock outstanding was $1,794,135,393, the dividends $159,337,461, (8.88 per cent) and the increase in stock outstanding was $131,727,861.

In 1919 the capital stock outstanding was $2,501,939,914, the dividends $165,635,212, (6.62 per cent) and the increase in stock outstanding was $707,004,521.

It is a point of the greatest significance that not only was the increase of the stock outstanding in 1919 equal to almost half the total stock outstanding in 1917 but also that this increase, namely, $707,000,000 in a single year was greater than the total outstanding capital stock of all of the companies in existence and referred to in the foregoing figures on January 1, 1912, namely, $682,632,909. So far as capital, therefore, is concerned, and referring to the group of companies whose statistics are being analyzed, 1919 is representative of the inpouring of capital into the business equal to the entire amount which had gone into the business from the time of the discovery of the Drake well to January 1, 1912.

No better illustration of the insistent capital demands of the industry can be given than that of the company which is regarded as the strongest of all the petroleum companies in the United States. In 1912 that company had outstanding stock aggregating $98,338,382, and, with the exception of the year 1913, that company has paid dividends on its common stock of 20 per cent or $19,667,660 per annum. In the year 1913 apparently the capital requirements of its business were so easy that it distributed a cash dividend in addition to the regular 20 per cent dividend of $39,335,320. In the years 1912 to 1919, inclusive, these dividends, including the cash distribution referred to in 1913, aggregated $196,676,600. Yet in the last year this great company, in order to keep its place in the sun and to meet the increasing demands of the public, has asked its stockholders and the public to give it $200,000,000, or more than the dividends referred to! It has said to its stockholders, "please give us back the dividends which we gave you. We need them in our business!"

Coming now to the capitalization of new oil and gas companies (not including new financing by established concerns) as per annual and monthly reports published in the Journal of Commerce, one finds a most astonishing de-

velopment. It is true that as to this group of companies it is not possible from the published figures to ascertain what the actual cash investment in capital stock is, but the figures do indicate a tendency.

In the year 1915 the statistics show 196 companies were organized with a capitalization of $80,533,000.

In 1916, 240 companies with a capitalization of $419,000,000.

In 1917, 512 companies with a capitalization of $840,000,000.

In 1918, 820 companies with a capitalization of $1,430,000,000.

In 1919, (despite the shortage of paper) 1629 companies with a capitalization of $3,786,000,000.

In the first ten months of 1920, 1526 companies with a total capitalization of $2,411,944,000.

Great increases in capital have been required and will be required, not only because of increasing labor and material costs and of the enlargement of plant and transportation facilities to carry on the constantly increasing quantity of oil to be handled, but also to finance the carrying of the increased value of petroleum and its products.

In no better way can this fact be illustrated and also the further fundamental fact that the oil business, under competitive conditions, has been struck by the impact of a tremendous demand than to state the increases in the value of the crude oil produced in the United States for a period of years.

Following is a table of the value of crude oil each year in the United States commencing in the year 1908 and ending in the year 1918, together with my estimates of the value of crude oil produced in 1919, and produced and to be produced in 1920:

Year	Value
1908	$129,079,184
1909	128,328,487
1910	127,899,688
1911	134,044,752
1912	164,213,247
1913	237,121,388
1914	214,125,215
1915	179,462,890
1916	330,899,868
1917	522,635,213
1918	703,943,961
1919	789,432,710
1920	1,300,000,000

According to the figures of the Geological Survey the total of all oil produced in the United States, since its discovery down to and including the year 1918, was $4,528,867,168. So the estimated value of the crude oil produced and to be produced in the United States in the year 1920 is equal to one-fourth of the value of all the crude produced prior to 1918.

When we add to the figures for 1920 the values of oil imported from Mexico and then realize that this increased cost of the raw material must have added to it vast transportation, manufacturing and distributing costs, the financial necessities of the oil business, if the production of oil is to equal the constantly increasing demand, become such as to leave my mind in a state where I am willing only to state the concrete facts and leave deductions as to the exact future capital requirement of the oil business to others.

The one deduction which I make from the foregoing is that if the public demand for petroleum is to be met, the oil business must be left absolutely free and unrestricted in its entire competitive development, financial and otherwise.

Oil Men and Automotive Engineers Discuss Power In Joint Session

Staff Special

WASHINGTON, Nov. 20. — The most popular of the group meetings was the one on Efficient Utilization of Fuel Oil, Motor Fuel and Lubricants, held at the Hotel Willard and lasting thru both Wednesday and Thursday morning. These sessions were largely in the hands of members from the Society of Automotive Engineers, and they were presided over by H. L. Horning and Henry M. Crane.

Papers by oil men were read by C. W. Stratford, Associated Oil Company, on "Gas Engine Lubrication," and by W. F. Parish, of the Sinclair Refining Company, Chicago, on "Dilution of Crank Case Oil."

The report of Chairman Horning on the discussion at the conference is as follows:

"There was considerable discussion of oil viscosity as affecting engine mechanical efficiency. An important problem in connection with the efficient utilization of fuel is securing adequate vaporization, it being advocated that the lightest lubricating oil possible under the prevailing conditions should be used. There was mentioned the inclusion of free, fatty acids in lubricating oil, which has been discussed recently in connection with the so-called derm-process.

"Various matters in connection with piston design and clearances were taken up.

"The improved utilization of kerosene, which the farm tractor industry has developed, was emphasized. The load on tractor engines being maximum a large part of the time, kerosene can be used as fuel for them better than for passenger cars, in the case of which the engine loads fluctuate greatly and are light a large part of the time. For a similar reason the heavier fuel can be used in motor trucks more satisfactorily than in passenger cars. Special devices, including hot spots, have been installed on tractors for the purpose of securing better vaporization of the fuel.

"The most important feature of the meeting was the discussion of the proper end-point for gasoline for automobiles. It was argued by Mr. Crane that it is impossible to build into an automotive engine to be used widely by the public non-adjustable devices that will burn the present gasoline as efficiently as it should be burned. On many cars the heavy end-points of gasoline go into the combustion chamber in a liquid, and not in a vapor or a fog form. Under these conditions it is impossible to combine air with the fuel in proper proportion constantly; the heavier portion of the fuel cannot be taken care of by the carburetor. The public wants good car acceleration, and this can be done only with a richer mixture than is most economical. It is felt by the automotive engineers that a considerable percentage of the gasoline currently produced is waste material, inasmuch as it is not burned in the engine, but produces crank case oil dilution, engine carbonization and other objectionable conditions.

"Mr. Crane said that it is very doubtful whether any portion of a petroleum fuel having a distillation temperature above 400 degrees F. is of value in an automotive engine for general use. With reference to the economic use of gasoline by motor car users, it is thought that improvement in this respect is principally dependent upon educational movements, and better service conditions.

"To secure greater thermo efficiency of automobile engines, higher compression pressures than are currently used are necessary, and it is apparent that to this end modification of the gasoline currently produced is essential. The volatility of the present fuel should be exhaustively investigated, and it is believed that the oil chemists and the automotive engineers will proceed aggressively in this connection, each group supplementing the efforts of the other by research work. The matter of the widespread use of small economical cars is inexplicably involved in the public demand. It is very questionable whether the time will ever come when the American public will be satisfied to shift gears frequently enough to secure full-load engine conditions and resultant economy.

"The representatives of the oil industry stated that they receive less complaint from automobile users now with regard to gasoline than they did several years ago when 300 degree end-point fuel was to be had. The automotive engineers feel that the currently produced 437 degree end-point fuel has never been demonstrated by scientific tests to be the most economical automotive engine fuel that can be made available to the public under present conditions.

"There was considerable argument at the meeting with regard to the reason for decreased use of motor cars in winter, that is the extent to which it is attributable to difficulty in engine starting in cold weather. The starting trouble can be ascribed partly to the fuel and partly to the lack of adequate auxiliary engine apparatus. Undue carburetor choking, choking being necessary frequently in a starting, results in maintenance difficulties, such as crank case oil dilution, dirty valves, and engine carbonization.

"It is believed that the very beneficial co-operation that has been inaugurated within the last year between the American Petroleum Institute, the Society of Automotive Engineers, and the National Automobile Chamber of Commerce, will be extended in scope and effectiveness, resulting in frequent interchange of information between automotive engineers, and oil chemists, and incidentally the authoritative determination of the most economical automotive engine fuel end-point for both summer and winter service."

Cooperation Is Key To Conservation Of Oil Resources

By M. L. Requa

Vice President, Sinclair Consolidated Oil Corporation

MUCH has been said in the past in criticism of the extravagant and wasteful manner in which America has developed and exploited her mineral resources. It was inevitable, I think, that it should have been so. And yet, was it really waste? The very profusion and seeming limitlessness of our resources made for extravagant development and consumption. Why should we conserve, when products were a drug on the market and the available supply apparently without limit?

There was apparently neither reason nor necessity. Nor must we forget that the very speed with which we grew was made possible only by ignoring waste and making prodigal use of what we had at hand.

The technology of all industry has grown with the industry itself; methods of yesterday are obsolete today, and those of today will be looked upon tomorrow with amazement because of their crudity.

It has been so in the petroleum industry; the standard or rotary rig of today, the methods of transportation, refining, and distributing, are the outgrowth of years of effort in perfecting the tools of the trade; and the methods which now seem wasteful or inefficient were when first used the acme of perfection.

I have no quarrel with those venturesome spirits who from Pennsylvania to California gambled with fortune in an effort to "strike oil." They had the spirit to do and to dare; the courage of their convictions in attempting to wring petroleum from the unwilling earth; and to them all credit is due for the pioneer activities that in their results are little short of miraculous.

They were of the bone and sinew that builded the nation, and because they have passed the nation is the poorer. They labored under enormous handicap, doing the best they knew how, but, somehow, some way, somewhere, producing the material that over the last sixty years has, with electricity, most profoundly effected the growth of modern civilization.

The growth of industry may be divided into three epochs: The period of pioneering (the period of rapid development, and the period of maturity. The pioneer period was marked by dearth of capital and distribution facilities and surplus of natural resources. Under these conditions resources were necessarily exploited inefficiently; the main consideration was to get out the product and market it as best might be. There was in those days a strong justification for resource waste; it was the only answer to the problem.

I have little patience with the Europeans who attempt to compare our conditions with their own. There is no comparison possible. There—an old civilization, a settled and dense population, and short distance to travel from place to place. Here—a continent to be conquered and peopled, a civilization to be created, vast distances to be overcome; in short, a new world to be fashioned for the habitation of man. And it was done. And if, in the doing, those who pioneered the way fell short of discharging full obligation—as conceived today by urban dwellers in the east or in Europe—those of us who were ourselves a part of it or who are the descendants of those who did fashion the nation, may rest content in the knowledge that there has been written into the pages of history an achievement that needs neither apology nor defense.

We have passed two of the great periods of our growth, and we are now face to face with the third and last period, wherein it becomes necessary to scrutinize not only our resources, but also our methods of utilization, to the end that the maximum use may be obtained.

Depreciation, depletion, amortization, are no longer academic terms, but are very real and practical issues. And with it all, of course, is the need to consider how best we may conserve our reserves which are to furnish the justification for the enormous investment representing our manufacturing and distributing facilities that function satisfactorily only thru the continuous flow of raw materials.

We have rounded the turn that marks the division between callow youth and mature age; we have created our capital, attracted our labor, and now the need is for coordinated development and rational conservation, which is the very essence of practical effort in that it endeavors to prolong production and increase quantity without interference with consumption.

In its broadest sense, the wise and full utilization of our natural resources, in the future, is a very vital as well as a very practical issue.

We have therefore to do with the future; and in so doing it is well that we must keep our eyes looking ever forward, lest we confuse the problems of past generations with those vastly different ones we shall have to solve in the future. What has been, has been; but that is neither reason nor excuse for assuming that we can successfully apply in the future the methods that have been used in the past.

Having sketched for you, in rough outline, some of the fundamentals underlying the problem of conservation,

Developing Supplementary Resources

Coal, Shale Oil, Alcohol Seen As Aids

MR. REQUA, who during the war was the director of the oil division of the United States Fuel Administration, spoke at the Friday afternoon session of the meeting on "Conservation."

¶He traced the growth of the country thru two periods, that of pioneering and that of development. He pointed out that during the early development period, when natural resources seemed inexhaustible and the quick exploitation of them only could keep pace with the growth of the country, wasteful methods of production were excusable or even necessary, but that now we have reached the maturing stage of progress.

¶At present conservation is imperative, he says, in making the most of our oil resources. This conservation should be accomplished, he believes, largely thru complete co-operation in the industry, pooling of information by producers and refiners and adoption of the best methods and practices thruout the industry.

¶He believes the industry should pay much attention to the development of coal, shale oil and power alcohol as auxiliary resources to relieve the burden of the demand on oil.

I shall address myself more particularly to the problem of conservation as related to the present and future of the petroleum industry. I shall not attempt to do more than point out some of the unsatisfactory conditions that can be, I think, successfully attacked by the industry.

I appeal more in the questioning mood, asking is it not possible for the industry thru cooperation to find ways and means to bring about more satisfactory conditions?

Criticism is an avocation indulged in with great glee by many theorists who attempt, with all the cock-sureness of ignorance, to dictate methods and policies. I shall not, I hope, be guilty of such an attitude; but there are questions to be asked of the industry that deserve a respectful hearing and an answer. That answer cannot be made lightly nor unthinkingly, but rather only after deep reflection and debate. To answer the questions satisfactorily will require extended cooperative investigation.

For years the Bureau of Mines has been studying the problem of increasing the recovery of petroleum from oil sands as best it could with the appropriation available, and has expressed the opinion that only 10 per cent to 20 per cent of the oil underground is being won. Is it commercially possible to recover greater quantities, and how? What is the industry doing, cooperatively or individually, to recover more oil from the oil-bearing formations? Is there any cooperative study being given to this problem?

Do you know what California has done? Do you know the California State Water Commission has, in each field, peg models, cross sections, well logs, water maps, and all necessary data for centralized study of each field? Do the fields east of California have similar facilities under cooperative controls? If not, then why should not the states pass legislation similar to California? Or will the industry perform the task as a voluntary effort?

For more than four years the conservation of oil and gas has been under state supervision in California.

The natural gas reservoir in the Elk Hills field has furnished wells making more than one hundred million cubic feet daily. This discovery was directly due to the work of the department.

In the Coyote Hills a great number of wells were actually drilled thru an upper oil zone without productiveness being recognized. The department recommended that water be shut off above the zone, and wells bailed dry to test. The result has been several wells which flowed at the rates of from 400 to 10,000 barrels of oil per day.

In the Kern River field one well in a group of eight was plugged, and increased the total daily oil production from 135 barrels to 207 barrels, and reduced the water production from 1,758 barrels to 121 barrels.

In another group of eleven wells, repair work reduced the daily water production from 5,927 barrels to 240 barrels, while the oil production increased from 25 to 59 barrels.

Following these demonstrations many similar repair jobs have been carried on by property owners without an initial investigation by the department.

The petroleum industry has only indirect control over consumption, but over production, transportation, refining and distribution it has a very direct control.

The Bureau of Mines has compiled figures showing that refinery losses average approximately 4 per cent of the material run. Can these losses be reduced? Is there any joint discussion among refinery superintendents? Do they ever meet and talk things over? I am aware that economic pressure is the greatest incentive to conservation, but a proper understanding of the responsibility resting upon the oil industry, as the trustee of the people in the administration of a wasting national asset, will, I think, add even greater efficiency to that due solely to a desire for increased profits. And this awakening in itself will be the source of greater company profit by conserving and making available material that would otherwise be wasted, without profit to anyone.

In this connection I must emphasize the need for greater cooperation and more extensive pooling of knowledge on the part of oil refiners. There is too much false mystery concerning the processes in use by the average refinery.

The industry would gain if there were less attempt to maintain secrecy about processes which are really known to all. I would invite your attention to the attainments of the automotive industry, whose engineers for many years have been accustomed to come together in annual meetings and make common property of their advances. The units of an industry go forward or fall behind in unison, and in the long run the furtherance of technical proficiency rather than its restrictive application is for the general good.

Burned under boilers, fuel oil is at best wastefully consumed, and at worst is losing in every barrel 20 per cent to 30 per cent of lubricating stocks that we shall some day need, and need badly. Over any long period its future use in this manner is without excuse or justification.

Employed as a fuel in the Diesel or semi-Diesel type of engine, the saving amounts to as much as 75 per cent of the oil burned; and economic pressure will, of course, force greater and greater use of this type of engine, especially for marine work. I seriously question whether the marine steam engine is not today obsolete.

Certainly with more than 140,000 gross tons of Diesel-equipped shipping now under construction in the United States, and the large foreign fleets in operation or building, the Diesel type is no longer experimental and must, in future I think, supersede steam-driven units with ever-increasing rapidity, because of absolutely economic reasons if for no other. A recent report of Lloyds indicates that 16.3 per cent of the world's tonnage is now employing fuel oil, and already 1.7 per cent of the world's tonnage is converting fuel oil into power by means of the Diesel type of internal combustion engine. Since the United States is planning a great expansion in foreign trade and is building a substantial merchant marine, we will ignore a most potent point of superiority if we neglect the significance that motor ships have upon the situation.

The growth of requirements for gasoline, far in excess of production by old methods, has forced a diversion of fuel oil from its industrial role in the rank of marine and motor fuel. Because of this diversion, the gas industry has found it increasingly more difficult to obtain its accustomed quotas, and then only at higher prices.

Is the industry making any concerted effort to meet this new problem? Or is the individual interest given entire precedent to the exclusion of any consideration of public need?

In the past I have frequently referred to the pivotal importance of lubricating oils, and I need not emphasize to this audience the fact that the machinery of our industrial age is entirely dependent upon ample supplies of mineral lubricants. There is wide room for research not only in the production of these oils, but in the use of lubricating oils as well. It has been estimated that in the United States needless losses arising from imperfect or faulty lubrication run to as much as 50 per cent of the power generated. Is there any coordinated effort being made to improve this condition?

I should be remiss in my review if I did not call to your attention the means of conserving petroleum by the development of supplementary resources. The usefulness of oil is so great, and the requirements for oil products are so insatiable, that it is safe to say that the production cannot keep pace with the needs of civilization. Should we double the output this coming year the net result would merely be to double the range of requirements dependent upon petroleum. Irrespective of the size of our future production, therefore, we shall meet a demand of even greater proportions.

In recognition of this condition, and as insurance for continuity, we should not neglect, in proper time, to make easy the way for our resource allies. The oil shale industry, the coal refining industry, the power alcohol industry, with their potentialities and their limitations, deserve our close consideration. While they may superficially appear as competitors, they are, fundamentally, our allies. When the time is ripe I believe these supplemental sources of supply can be developed by the petroleum industry more advantageously than by any other agency.

The underlying fundamental truth seems to me absurdly simple. Either the industry must, thru self-government, prove its ability to meet and successfully deal with the economic forces confronting it, or, sooner or later, those forces will compel recognition and action on the part of the government. It is not a question of ignoring a condition, but rather of choosing the course to be followed. For we shall, regardless of our wishes, be forced to follow some road—either that of industrial cooperation and conservation, or of government dictation.

Government aid may be required; when it is, it can be asked for; but the task is emphatically one for the industry itself to perform, if it is to be done efficiently and properly. And so long as it is done efficiently and well, there is neither cause nor justification for governmental interference.

PERSONNEL of PETROLEUM

by H·I·Wood

JOHN M. CRAWFORD, president of the Parkersburg Rig & Reel Company, Parkersburg, W. Va., was in Washington during the week attending the tax revision conference with the revenue division of the Treasury Department, along with several hundred other representatives of industrial and producing corporations, including Judge J. J. Shea, W. N. Davis, Harry H. Smith, David F. Connolly and Mid-Continent Oil & Gas Producers' Association members. This is, probably, about as important a conference involving tax problems as has been held, being in reality a synopsis of previous hearings and near the climax. Daniel Roper, head of the revenue division, is known to be in sympathy with the principle sought to be established, and there is encouragement for the belief that the ideas brought out will be summarized in a bill likely to be introduced in the approaching session of congress. No remedial action can be secured except thru congressional enactment. The gist of all ideas growing out of nearly two years' effort is the equalization of surplus profits suddenly accruing from recent abnormal conditions to cover the full period of investment in whatever property produced the surplus. For instance, an individual or corporation began prospecting for oil five, eight or ten years ago, the investment totaling, perhaps, half a million or a million dollars, with ordinary results that may have left either a net loss or negligible net profits. Two years ago, say, a big well—or several of them—brought sudden net profits for one year of a million dollars. Present revenue laws enable the government to reach out and take half of this suddenly produced surplus profit for the fiscal period and wipe out the legitimate and only possible repayment of the profitless investment of preceding years. This inequitable process has interfered materially with normal business and development and tied up hundreds of millions of dollars in many lines, and is now admitted even by government officials and congressmen to exert a very depressing effect. Whenever this heavy drain upon invested capital and industrial wet blanket is abrogated, Mr. Crawford and numerous colleagues believe, there will be a decided revival of business thru liquidation and re-investment.

* * *

Fred C. Smith, of Houston, Texas, accompanied by Mrs. Smith, is attending the sessions of the American Petroleum Institute in Washington, D. C. Mr. Smith is vice president and general manager of the Galena-Signal refinery at Houston, and for years was with the Port Neches plant of the Texas Company. He has practically recovered from the automobile accident that nearly cost him his life in Chicago a year or more ago.

E. E. Grant, in attendance at the American Petroleum Institute meeting in Washington, had just returned from Houston, Texas, where he went to invoice the claims of the southern seaport as a desirable place for the next annual meeting of the Independent Oil Men's Association. The seafaring petroleocrats of the Ship Channel took the I. O. M. A. secretary out on the bounding billows and brought him into port a full-fledged admiral, sea legs and all. That ripsnorting old marine buccaneer, Secretary of the Navy Daniels, hasn't anything on Admiral Grant, of the Great Lakes squadron, not even an intimate personal knowledge of the renowned Goose Creek oil field on both sides and in the middle of San Jacinto bay, part of the product from which was commandeered by the naval chief at the beginning of hostilities. The well-known hospitality of Houston will easily sustain its reputation in comparison with some of the don't giveadam hotels of Denver. (Great applause.)

* * *

Meeting David F. Connolly, of Tulsa, Wolverine Oil Company manager, in Washington during the week attending the tax conference, Osage lessees' hearing and the American Petroleum Institute, recalls an incident that occurred many years ago in West Virginia. Mr. Connolly took over the drilling equipment of a local Charleston, W. Va., company headed by Lloyd Smith, director of the Kanawha hotel, and moved it to a block of his own leases. The location of the test was made to prove part of the Smith acreage and he was naturally much interested in the progress of the work. Because of a little double-crossing in withholding acreage agreed to be turned in, Mr. Connolly was extremely careful about letting any information get outside the lines, but agreed to keep Mr. Smith advised. After getting into the sand far enough to solve the problem Mr. Connolly sent the following wire to Mr. Smith at Charleston: "Hebrews 13:8." When the tall and now gray-haired Kanawha host received the message he asked such friends as he could immediately approach what they supposed that bunch of hieroglyphics meant. At one supply store an ancient history student told Smith it was a scriptural designation and to consult a Bible. Even in those prehistoric days a Bible was found in Charleston and the cited verse read: "Jesus Christ yesterday, today and forevermore the same." First publication of this joke in fifteen years.

* * *

W. J. Kirkwood, of Tulsa, is president of the newly-chartered United States Petroleum Company, capitalized at $100,000, to operate in Oklahoma, associated with Kansas City and Oklahoma men. Pierce Larkin, formerly with the Oklahoma geological bureau and the U. S. Geological Survey, will direct prospect work. Mr. Kirkwood has been operating in Oklahoma fifteen years, latterly having charge of and interested in four casinghead gasoline plants in the Tulsa district. He formerly operated in Pennsylvania and eastern oil fields.

* * *

W. L. Connelly, of Houston Texas, was in Washington, D. C., during the week, after a visit to New York headquarters. He is vice president of the Sinclair Consolidated Oil Corporation in charge of Gulf Coast pipe line and production operations, and director of all Sinclair operations in Mexico, as the Freeport & Mexican Fuel Oil Company. He spends most of the time in Mexico, having been present when the gusher was recently drilled in in the Amatlan district. The well is now flowing steadily 43,000 barrels a day, its initial production having been 68,000 barrels. Three Sinclair employes were shot and killed last month in Mexico while conveying a payroll, but Mr. Connolly has never had any trouble during all his travels thru the oil fields. He likes Mexico and believes the new president and his government will be successful and adjust amicably and satisfactorily all problems. The population, Mr. Connelly finds in his travels in Mexico, is returning to normal peaceful pursuits and rebuilding the guerilla-burdened industries and areas. Years ago Billy Connelly began oil field work in a modest way in northwestern Ohio, and for sixteen years has been with Harry Sinclair and helped produce oil in Kansas, Oklahoma, Texas, Mexico, Illinois and Kentucky, until he is beginning to feel like the oldest producer going. He has sagatiated around some pretty big oil and gas wells in Oklahoma and Texas, but watching the tools blow out of a hole tangled up with sixty or seventy thousand barrels of Mexican oil seems to have smeared his early 15-barrel Kansas exuberance somehow and given it a blase finish. Adios.

* * *

E. B. Howard, present Democratic congressman from the Tulsa district, when he retires next March will function as director of accounting for the R. E. Seamans Company, Inc., being vice president. The corporation is interested in Oklahoma production. Representative Howard was state auditor of Oklahoma preceding his election to Congress and knows petroleum accounting fore and aft. In passing it may be remarked that Mr. Howard is the only representative Tulsa has ever had in Congress and he has been very attentive to the interests of his constituents. To that extent the recent

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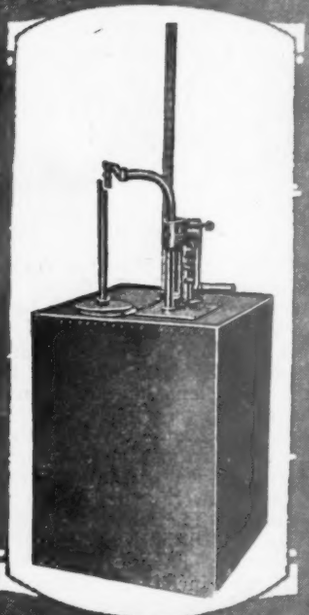

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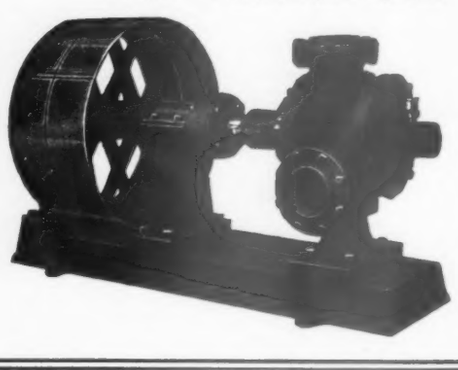

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high water and landslide were as much of a catastrophe as a blessing.

* * *

E. R. Brann, Mid-Continent manager for the National Exploration Company, is a son of James Brann, of Bartlesville, formerly of Warren, Pa., where E. R. was born. Before going with the National Exploration Company Mr. Brann was pipe line engineer for Cosden & Company. The National Exploration Company, heavy purchaser of leases at the October sale of Osage tracts, is affiliated with the Union Oil Company of Delaware, operating in many oil fields of the United States.

* * *

Having graduated in secular and trade journalism and retired into the alumnus stage, Holland S. Reavis can now find leisure to pull the finished product stuff and get away with it—we have the goods on him. Looking over the New Willard lobby a fleeting expression was traced to its lair six feet above the tiling. This circumstantial evidence became a demonstrated cinch when the official program revealed the author of "Problems of Collection of Petroleum Statistics." And he admitted it when cornered. It's a problem, all right, as one other wrinkled and dusty scout can bear witness to, of or about from Spindletop and Salt Creek to Sipe Springs. That other wrinkled and dusty scout gives it out cold that some time, somewhere, within the next forty years, he's going to break into the free and unrestricted public life of oil and break up some association meeting with a premeditated essay on something or something else and join the aristocracy of petroleum. This obsession has grown and festered into a sore spot that's got to come to a head and break, if it takes another operation, for he's tired of being the fag end of the scout parade. And then R. L. Dudley, the Gulf Coast petroleum publicist, broke into a glad statistical refrain. How do they get that way?

* * *

After many, many years of scouting, looking 'em over and passing 'em up Jack Shannon is now attending the tax conference in Washington, D. C., as big as ever within a few ounces. He's looked 'em over from Tidioute, Pa., to Taylor, Texas, for the Jenningses and the Snowdens, until his cold, calculating eye has acquired a glazed cold test that the Arctic circle couldn't faze. Foregathering with countless thousands when north-central Texas was sovietted. Jack picked a block of acreage along the northeast shank of the Stephens county anticline where it intersects the Breckenridge townsite, and it worked. After developing a daily production of 8,000 barrels on outside acreage, he offsets the courthouse and gets a 8,000-barrel gusher. If any one asks is Jack Shannon a pernicious picker of petroleum patches I'll say he is. And then he went home and voted the straight Democratic ticket.

* * *

Charles Owen, of Caney, Kans., was one of the large number of oil men who attended the Washington annual meeting of the American Petroleum Institute during the week. He is a living example of concentrated and consolidated effort, having acquired his first oil production near Copan, within fifteen miles of Caney, then laid a four-

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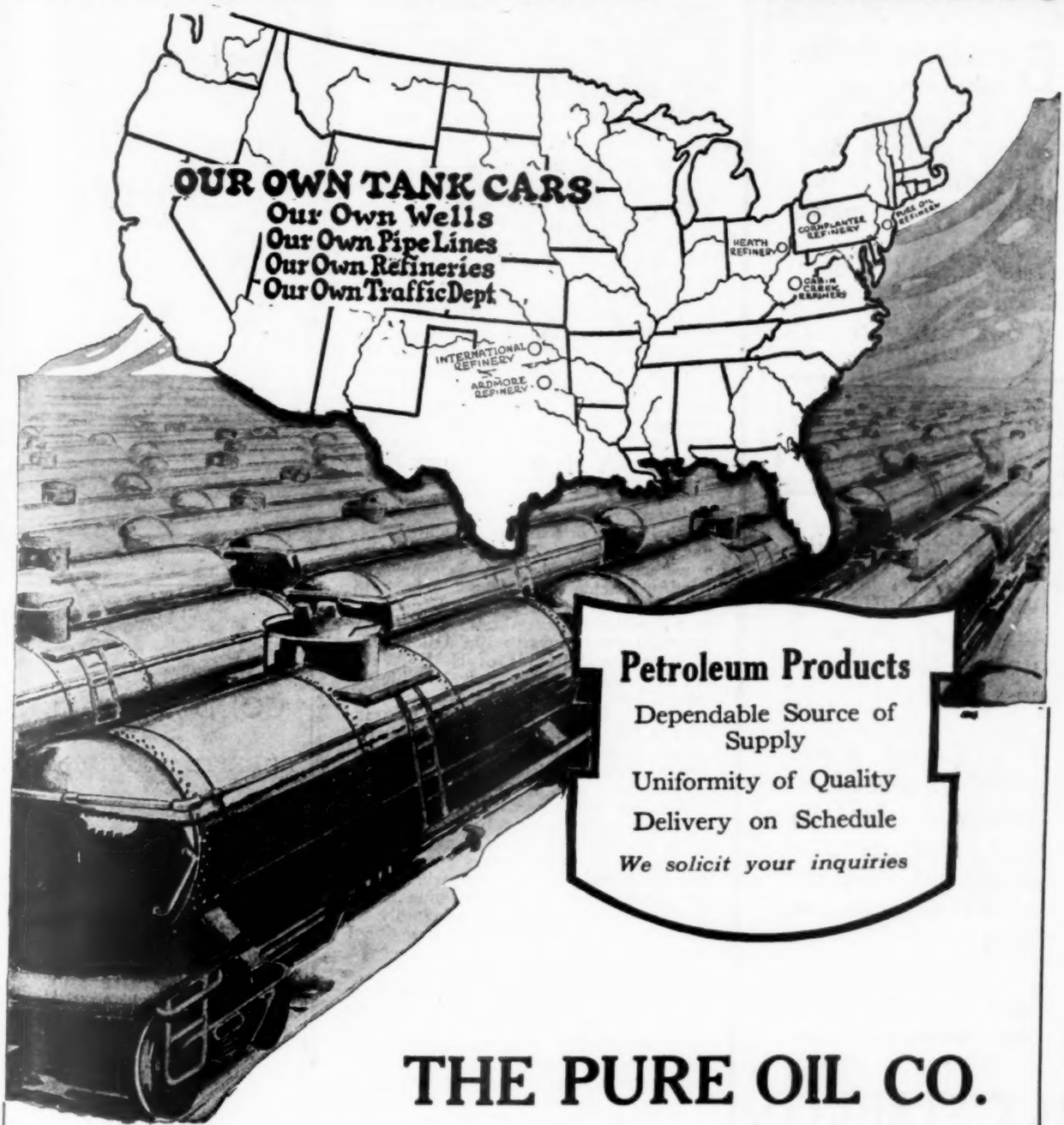

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mile gas line across the state line into Caney and later acquired a hundred thousand acres or so of Osage gas territory that cornered only two or three miles southwest of Caney. He has continued to reside at Caney as he prospered, and he has prospered equally with those who have covered everything between Pennsylvania and California. His cousin, Robert L. Owen, has strayed afar into the United States senate, and his brother, Owen Owen, moved to Tulsa and is now district judge; but Charles has steadfastly held to Caney and thoroly enjoys returning to the quiet and reasonably prosperous town after brief visits to Washington, New York and other jazz seaports. The temperamental equilibrium of Charles Owen is something to admire.

* * *

J. B. Hazlett, of Denver and Cheyenne, was in Washington for a few hours during the week hoping to meet J. E. O'Neil, president of the Prairie Oil & Gas Company, and a director of the American Petroleum Institute, coming from Baltimore, where he has been in process of fractional dissection for three months at Johns Hopkins hospital. He has taken on twenty pounds weight and expects to be fired bodily from the clinic in a week or ten days as of no further surgical, medical, physiogolical or therapeutic use to the operators of that infirmary—able to run on his power in fact. By some combination of synthetic metallurgy and plastic legerdemain they have succeeded in half-soling, wall-packering and setting a shoe in, on or around the south half of one of Mr. Hazlett's kidneys and got it to functioning equal to a water-stimulated well in the old Bradford field, and he's going back to Salt Creek and Lost Soldier, Wyoming, as a hard-boiled lease boss. And that's certainly good news to Jim's thousands of friends and friends of H. E. West, his partner, who may now be able to take a few days off and get a mess of rabbits in Chautauqua county, Kansas. Seeing Mr. Hazlett in Washington recalled another visit he made to the metropolis of oysters and canvasbacks fifteen years ago, when James A. Garfield—then secretary of the Interior Department—after asking Jim many questions to which he received uniform answers of "I don't know," somewhat peevishly said: "For a man who knows as much about producing, pipe lining and handling petroleum profitably as you do you know less than any one I ever met."

* * *

M. Burke, of Denver, Colo., has been in Washington, D. C., much of the time during the last four years and is pretty well acquainted in the national capital. He formerly lived at Casper, Wyoming, and naturally acquired some Salt Creek oil placer claims. Having persevered, Mr. Burke has secured recognition for some of his claims and approval for others. The Kasoming Oil Company, organized by West & Hazlett and the Prairie Oil & Gas Company to operate in Wyoming, is drilling one of these approved leases in Sec. 11-39-79, having completed ten producing wells and has 17 rigs up and drilling. One of the wells, offsetting an E. T. Williams Oil Company well that has been producing two years, was drilled down to the third Wall Creek sand at 2,600 feet is steadily making 250 barrels.

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Medal Is Awarded To P. J. Hurley In Tulsa On Third Armistice Day

Staff Special

TULSA, Nov. 20.—The feature of the Armistice Day celebration here was the presentation by the War Department of the Distinguished Service Medal to Patrick J. Hurley, vice president of the Gilliland Oil Company, former lieutenant colonel of the 76th Field Artillery,

Patrick J. Hurley

for exceptional gallantry in action. Mr. Hurley, during the closing days of the war, was judge advocate of the artillery section of the American First Army, and later represented the army in the various negotiations between the A. E. F. and the Grand Duchy of Luxembourg. While he rendered a great service to the country in his judicial capacity, it is the citation for gallantry in action that is particularly dear to the Colonel's heart. He much prefers to recount his experiences in the closing days of the war, when he saw active service, than during the period when he exercised the vast authority of judge advocate on the Sixth Army.

At the request of Mr. Hurley, the presentation of the medal was held in Tulsa, rather than Washington, which has been customary. The citation and award of the Distinguished Service Medal were as follows:

Citation for Gallantry in Action
UNITED STATES ARMY

LIEUT. COLONEL, PATRICK J. HURLEY, F. A., ATTACHED TO 76th F. A. FOR DISTINGUISHED AND EXCEPTIONAL GALLANTRY AT FOREST DE WOEVRE ON 10th NOVEMBER, 1918, IN THE OPERATIONS OF THE AMERICAN EXPEDITIONARY FORCES IN TESTIMONY THEREOF, AND AS AN EXPRESS OF APPRECIATION OF HIS VALOR, I AWARD HIM THIS CITATION.
AWARDED ON 27th MARCH, 1919.
(SIGNED) JOHN J. PERSHING,
COMMANDER-IN-CHIEF.

The War Departments' order awarding the medal reads:

"Award of distinguished service medal. By direction of the President, under provisions of the act of congress, approved July 9, 1918, a distinguished service medal was awarded by the war department to the following-named officer:

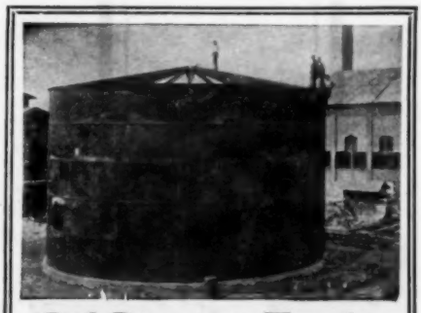
"Patrick J. Hurley, lieutenant-colonel, judge advocate general's department, United States army. For exceptionally meritorious and conspicuous services. Assigned as judge advocate, army artillery, First Army, he rendered services of marked ability, performing in addition to his manifold duties, the duties of adjutant general and of inspector general. Later, as judge advocate of the Sixth Army Corps, he ably conducted the negotiations arising between the American Expeditionary Forces and the Grand Duchy of Luxembourg, wherein he displayed sound judgment, marked zeal and keen perception of existing conditions. He has rendered services of material worth to the American Expeditionary Forces. Residence at appointment, Tulsa, Okla."

Coal-Distillate Oil Poor As To 'Lubs.'

J. E. Hackford, British petroleum technologist, said recently, concerning the future fuel supplies of the British Empire, that the coal supply of the world at the present time was practically an estimate of its fuel requirements, and if it stood at 100, the fuel oil supply of the present day represented only 3 per cent of the total of the whole of the coal.

While during the war everyone realized the value of oil as a fuel, 3 per cent could not be made to do the work of 100 parts of coal. The question of national security and the cutting off of supplies of oil was a grave one. If coal was to be distilled with a view to obtaining oil to augment the supplies of oil naturally found in Great Britain without introducing supplies from outside, it seemed to him that every care should be taken only to use the class of apparatus which would supply the greatest amount of uncracked fuel oils. He used the term "uncracked" advisedly, on account of the fact that, while engines existed, lubricating oils were needed, which came from natural petroleum oils after care in their manufacture had been taken. In making fuel oils from coal, a very satisfactory fuel oil, motor fuel, wax, etc., could be obtained, but the quality of the lubricating oil produced from the distillates of coal were very poor, if not negligible.

All those processes, therefore, which had as their object the manufacture of fuel from coal should be regulated with a view to obtaining as much of the oil as possible. For example, supposing an oil gave 20 gallons of tar, that represented about 8 per cent of the weight. A lot of coal had to be distilled in order to augment fuel oil supplies to bring available power from the 3 per cent of the consumption to the 100 per cent of the consumption.



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by Andrew Campbell
Member of the Institute of Petroleum Technologists

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DULUTH MINNESOTA

California Oil Export Is Nearly $2,000,000

By Special Correspondent

SAN FRANCISCO, Nov. 18.—Crude oil and its refined products valued at $1,869,648 were exported from the customs district of San Francisco during the month of September. The exports are itemized as follows: Crude oil, 1,008,440 gallons valued at $48,084; Fuel oil, 12,240,510 gallons, valuation, $590,879; lubricants, 501,974 gallons, valuation $161,128; illuminants, 5,475,273 gallons, valuation, $717,067; gasoline, 925,925 gallons, valuation $334,724; other napthas, 176,944, valued at $56,339. Subdivided into countries the exports and their valuation were as follows:

	Gallons	Value
Australia		
Gasoline	144,000	$56,880
Other napthas	4,800	1,541
Lubricants	117,600	41,880
Fuel Oil	255,150	10,935
Straights Settlement		
Lubricants	25,000	$4,125
British Oceanic		
Illuminants	1,000	$301
Lubricants	113	199
British India		
Lubricants	60,000	$9,850
England		
Lubricants	5,000	$1,487
Canada		
Lubricants	22,985	$7,991
Fuel	9,030,000	430,000
Colombia		
Illuminants	180	$25
Chile		
Illuminants	190	$ 47
Lubricants	38,900	9,110
Fuel	2,950,466	149,498
Panama		
Crude Oil	1,008,000	$48,000
Peru		
Lubricants	18,958	$12,687
Philippine Islands		
Gasoline	482,000	$185,600
Other napthas	50,000	76,250
Lubricants	10,052	4,460
Salvador		
Gasoline	23,979	$9,232
Lubricants	2,434	1,504
Costa Rica		
Illuminants	1,550	$239
Lubricants	1,100	832
Guatemala		
Gasoline	3,050	$763
Other napthas	2,500	463
Illuminants	120	34
Lubricants	1,510	937
Ecuador		
Illuminants	32,000	$1,017
Lubricants	100	60
Honduras		
Gasoline	1,000	$385
Lubricants	220	140
Nicaragua		
Gasoline	1,350	$570
Lubricants	281	161
Mexico		
Gasoline	3,686	$1,654
Other napthas	3,100	510
Illuminants	400	100
Lubricants	434	461
Fuel Oil	4,354	352
Crude oil	440	84
New Zealand		
Gasoline	266,860	$96,870
Other napthas	116,544	37,573
Illuminants	26,100	6,216
Lubricants	95,279	39,13 1
China		
Illuminants	2,700,000	$284,000
Lubricants	55,163	13,318
French Oceanic		
Lubricants	2,716	$1,197
Other Oceanic		
Lubricants	456	$283
Fuel Oil	540	96

Mid-Co Oil Sales Company, of Chicago, has opened a New York office at 50 Broadway, with M. Lloyd Freese, lately of the Chicago office, in charge. Jesse Finston, president of the company, will maintain headquarters at the New York office.

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Cities Service Men Called In Conference

BARTLESVILLE, Nov. 18.—Officials and department heads of Cities Service Company subsidiaries have been called together for a conference at the Waldorf-Astoria, New York, Nov. 22-24. The conference is for the purpose of discussing the present condition and the outlook for the coming year as it pertains to Cities Service companies.

The following from the Empire Oil & Gas Company and Empire Refineries, Inc., were to attend: H. R. Straight, C. E. Murray, W. J. Moran, T. P. Steeper, H. L. Montgomery, E. L. Peck, S. B. Severson, E. J. Nordstrom, L. C. Snider, J. P. Fisher, P. M. Miskell, H. G. McLean, R. C. Russum, V. B. Day, L. A. Ramsay, L. G. Coleman, F. C. Brown, C. J. Shortess, A. B. Collins, W. A. Lynott, J. E. Grattan, N. M. Hutchinson, J. S. Cordell, J. V. Schilling, H. O. Caster, R. M. Stuntz, E. F. Curtiss, H. H. Sloan, J. J. Allinson, M. R. Shaffer, H. E. Butcher, S. A. McCune, R. T. Wells, W. H. Middleton, A. C. Holmes, J. M. Landon, V. C. Jarboe.

Higher Efficiency Of Oil-Driven Ship

Preference for 4-cycle ocean-going motor engines over 2-cycle engines was expressed recently by Sir Trevor Dawson, vice-chairman of Vickers, Ltd., noted British builders of marine motive-power. The result of experiments has proven, he said, that the 4-cycle type is simpler and requires less technical skill at sea, and carries fewer auxiliary engines. The English builders claim to be abreast, indeed if not ahead, of American builders in such matters. As evidence of such efficiency, the Anglo-American Oil Company's first ocean-going motor-tanker, the "Narragansett," was cited.

This vessel made the trip to New Orleans and return at an average speed of 11.1 knots and at a daily expenditure of oil plus boiler fuel of 12 tons. In oil-fired reciprocating engines 35 tons of oil would have been required daily. In a coal-fired steamship of the usual pattern, 50 tons of coal would have been consumed. In other words, the Vickers type can be run roughly on one-quarter the cost of a coal-burner. While the firm guarantees 10½ knots an hour, a ship of their construction is said to have crossed the Atlantic easily at 11.2 knots.

These engines are claimed to be an immense improvement over the firm's most successful type of heavy-oil engine for warships and submarines. At Barrow a total of 500,000 horse-power heavy-oil "warship" has been turned out. These engines have now been adapted for mercantile use, with progressive efficiency. The firm's first venture was the "Trefoil," with twin engines each of 750-horse-power. The "Santa Marguerita" was of 2,500 horse-power, while the "Narragansett" produced the same power with six instead of eight cylinders. The two main engines of the "Narragansett" have each six cylinders with 24½-inch diameter and 39-inch stroke, developing 2,500 brake horse-power at 118 revolutions.

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Paul Wagner, Manager

Encouragement To Osage Operators

OF outstanding importance to operators in the Mid-Continent field the past week was the modification in acreage limitations heretofore in force on Indian lands in Oklahoma and which for a long time have been felt by those who were developing Indian lands, particularly the Osage tribal reservation, to be unjust in that they were needlessly restrictive.

The next sale of acreage in the Osage will be held under rules which will permit operators to purchase without restriction in the western half of the reservation, the lesser developed part, and in the eastern part up to a maximum of 20,000 acres, the latter being the total acreage which may be held by any company or individual, inclusive of that which may be held at the time of the next sale. In the southern and western parts of Oklahoma, oil and gas leases on tribal lands may be acquired up to a total of 9,600 acres by any one company.

Change May Stimulate Development

Production in the Osage at this time is now 10 barrels per well, and in view of the quick depletion of wells in certain parts of the reservation, the action of the Department of the Interior in modifying the acreage restrictions will tend to encourage a thoro testing of all the reservation that looks favorable. This, to give point to the whole situation, will be a necessity by the time spring comes with the attendant greater demand for crude oil, for declines in production in the Mid-Continent already since development has begun to fall off, indicate that further and greater declines may be looked for thruout the winter.

Nothing happened during the week in the Mid-Continent fields to indicate the discovery of prolific pools. In Okfuskee county a wildcat well is showing for a commercial producer, and in Cotton county a gas well has started making 125 barrels of oil daily. Neither of these was of such nature as to cause any marked enthusiasm.

Breckenridge Storage Being Filled

In the Texas fields, the situation at Breckenridge, Stephens county, is described as having almost reached the point where the over-production will be seriously felt. Pipe line companies that have been running to tank farm storage the crude in excess of the 85,000-barrel daily trunk line capacity are reaching the limits of such storage. At the beginning of the week, however, none of the wells in the congested area had of necessity been shut in.

Gulf Coastal production is rapidly scaling down from the peak reached in the recent congestion, when some oil in the West Columbia pool was run to earthen storage. No completions of more than local importance were had during the week, either in Gulf Coastal territory or elsewhere in Texas.

North Louisiana Without Incident

North Louisiana showed a gain in new production and in the number of producing wells completed, but no extensions of producing territories. A reported showing of oil in a previously abandoned test ten miles north of the Homer pool, two weeks ago, was given some credence, but has tested salt water.

Eastern fields were no exception to the general rule of quietness in producing areas and the week closed without important incident. The past summer will be recorded in the history of the oil industry as the season of greatest activity in the eastern fields up to this time, without noteworthy events other than the holding up of production averages, no new fields being opened up.

Late Field News

TULSA, Nov. 22.—In Okmulgee county, the Holliday Oil Company's No. 3, in the center of the east line of the northwest of the northwest, found the top of sand at 2,744 feet, and at 26 feet in is making 250 barrels. It is located in the same pool as the famous Willie King lease of the Texas Company and is rather a light well for this territory.

H. F. Wilcox Oil & Gas Company has a 1,000-barrel well in their No. 5 Stephney farm, in Sec. 24-15-10, Misener pool. Sand was found at 2,984-89 feet. It is an inside completion in this Wilcox sand pool which is showing a wonderfully high productivity.

SHREVEPORT, LA., Nov. 19.—According to advices reaching local oil circles today, the old Taylor No. 1 of the Roxana Petroleum Corporation, in Sec. 14-23-8, Claiborne parish, near Haynesville, La., and about 10 miles north of Homer production, which the new owners, the Smitherman-Palmer-Layne interests attempted to reclaim, has tested salt water, thereby blasting hopes of those who were encouraged several days ago by report that a showing of oil had been encountered at about 2,300 feet. This well originally was drilled by Roxana, which, after a test dry at about 3,000 feet, turned the interest in the lease back to the present owners.

Continental-Mex. Well In Chinampa Is Shut In

Staff Special

HOUSTON, Nov. 20.—Continental-Mexican Petroleum Company (General Petroleum Corporation, San Francisco) No. 1 Cardinas, lot 95, Chinampa, at the north end of the Los Naranjos district of the "lower country" of Mexico, is the latest well in that territory to go to salt water. This well, completed about two months ago on a cost-plus basis by the Mexican Gulf Oil Company for the Continental-Mexican interests, was rated potentially good for 50,000 barrels daily when brought in. The Mexican Gulf's well on the other half of lot 95 was shut in earlier in the month, when it began to show salt water.

Completions In West Virginian Fields Are High Spots In Featureless Week

By Special Correspondent

PITTSBURGH, PA., Nov. 22.—Excessive drilling in 1920 has prevented oil production from declining, and the closing months of the year find the operators busily engaged in an effort to maintain production. In the general decline now so widespread, there is little sign of a weakening of the crude oil market. Two reasons are advanced, namely, the tremendous vogue of oil as a fuel in engines and the decline in the flow of natural gas. At a hearing in West Virginia this past week, officials of the Philadelphia Company said the production of gas had declined 17 per cent in a single year.

Due to unfavorable weather most of the past week the number of completions is below the recent average, and as wells brought in were much below the recent average in their initial flow, the trade week was somewhat featureless. Until this past week, great energy had been shown in rushing field work before winter checked activities, and the fall period will go into oildom's records as one of the most spirited in years. Outside of the Myers-Long well on the Meek farm, in Washington township, Greene county, Pa., no well of note has been tapped in months. This producer averaged 450 barrels daily last week. The Manufacturers Light & Heat Company No. 3, an offset to the Myers-Long "gusher," is delayed because the tools were lost at the top of the sand. When the fishing job is ended and the well completed more will be known as to the status of this field, but it is a matter of much importance to record that for 10 days past the daily flow of the original well has been around 450 barrels.

Next in interest to the Southwestern Pennsylvania field, is the Berea grit development in Reedy district, Roane county, W. Va. On Sand creek there, the Heck Oil Company's test on the Fleming farm came in at 100 barrels daily. This district is comparatively new, but much work is planned for the winter. The Heck company alone has locations, rigs up and building and drilling for 18 wells.

The Cincinnati Oil & Gas Company shot its well on the Tinsley farm in Big Sandy district, Kanawha county, and raised the daily flow from 30 to 75 barrels.

Drilling in Boone County

Active development work has been started in Boone county by the Pure Oil Company, the tests being in the Berea grit extension in Sherman district.

The South Penn Oil Company got a 50-barrel producer in No. 6, on the Parrish farm, in Mannington district, Marion county. The pay was encountered in the Little Dunkard sand. In the same zone, the South Penn Company drilled to the lower sands at a test on the Gump farm, but found no oil. However a light gas pressure was encountered in the Gordon stray sand. Completions of the South Penn Company also include No. 27, on the Henderson farm, and No. 25, on the Inghram farm, both in Union district, Wood county, and the results are wells doing a few barrels a day. The South Penn Company's Cow Run sand test, on the Campbell farm in Lee district, Calhoun county, is a 5-barrel pumper. In Glenville district, Gilmer county, the South Penn's second test on the Lynch farm, is dry in the Maxon sand. The same company's test to the Maxon sand on the Hardman farm, on Little Laurel run, DeKalb district, Gilmer county, is a 20-barrel producer. The Snodgrass farm well in Mannington district is a 4-barrel pumper in the Gordon sand.

Efforts are under way to find new gas territory in Marshall county. The Manufacturers Light & Heat Company is setting the pace with tests on the Clauston, Teagarten, Matthews, Earnest and Frye farms. A. H. Shaffer & Company is drilling in Washington district, and a well is going down in the same area for the Oakdale & McDonald Oil Company. The Manufacturers Light & Heat Company also is operating in the Cameron district.

An important discovery in Pennsylvania was made when the well owned jointly by the Manufacturers Light & Heat Company and the South Penn Oil Company gave indications of being a 200-barrel Maxon sand producer. The oil was unexpectedly developed in the sand and and when first drilled in the flow was 40 barrels a day, but it produced 225 barrels the first 24 hours after the casing was set. The well is in a section that has been operated for gas, and is located on the Grimes farm in the Bristoria field in Aleppo township, Greene county.

The northern end of Allegheny county, Pa., received some attention when Dunlap & Company's test on the Rayman farm, in West Deer township, started at 25 barrels daily in the third sand. The well is in the old Gold field and is three miles from Bakerstown.

A 1,500,000 cubic foot gasser which the Ohio Fuel Supply Company got in Swan township, Vinton county, and a dozen three to seven-barrel wells completed within defined limits in Washington, Monroe and Hocking counties comprise the weeks' activities in Ohio.

North Louisiana Returns More Wells Completed Than In Previous Week

By Special Correspondent

SHREVEPORT, LA., Nov. 19. — During the past week the north Louisiana oil fields showed 19 completions, including two gassers, four failures and 13 producers with combined initial yield of 4,218 barrels, which was an improvement over the record of the preceding week, when there were 15 completions, including two gassers, six failures and seven producers yielding 718 barrels.

Caddo's record was better than for some weeks, being five completions, one a failure and the other four producers, with total initial yield 200 barrels. The previous week showed two producers making 50 barrels.

All of the six completions in the Homer district, including a 2,500-barrel well, were producers, the total yield being 3,925 barrels, compared with only one producer, yielding 300 barrels, and one failure during the preceding week.

In Bull Bayou there were only three completions, one a gasser. The producers had total initial yield of 58 barrels, compared with three producers making 343 barrels the previous week, during which also there were three failures and one gasser.

Bossier parish came thru with a 35-barrel producer, a failure and a gasser, practically the same record as during the previous seven days, when the only producer yielded 25 barrels.

In Rapides parish, in which is situated the city of Alexandria, the Clark No. 1 of S. J. Mountz, in 38-5-4W, was junked and abandoned at 3,200 feet, thus putting a crimp to the hopes in that section.

The largest producer of the past week was the United-Oklahoma Oil & Gas Company's Shaw B-6, in 25-21-8, Claiborne parish (Homer district), at 2,025 feet, 2,500 barrels. In the same section, 25-21-8, The Texas Company got a couple of producers, Lewis No. 2, at 1,387 feet, 720 barrels, and Lewis No. 5, at 2,017 feet, 500 barrels. In 29-21-7, at 1,450 feet, Simms Oil Company completed McClung No. 9 for 150 barrels; in 32-21-7, at 1,413 feet, the Rowe Oil Corporation completed Hardy No. 5 for 15 barrels, and in 30-21-7, the Gilliland Oil Company's Oakes No. 18, at 1,455 feet, came in with initial production of 40 barrels.

In Caddo parish, the Louisiana Oil & Refining Company's Bolinger No. 4, in 5-17-14, was abandoned at 971 feet. In the same parish, the same company got a 95-barrel producer in its Crye No. 10, in 22-21-15, at 2,336 feet; the Louisiana Con. O. & R. Company's Jolly-Spearman No. 5, in 23-22-15, was completed at 1,036 feet, initial production 35 barrels; the Dixie Oil Company's Robertson No. 34, in 14-21-15, at 2,385 feet, came in with initial yield of 30 barrels, and the Reclamation Oil Company's Harrel No. 5, in 12-21-15, was completed at 1,058 feet, yielding 40 barrels.

In Bossier parish, the Arkansas Natural Gas Company completed Price No. 147, in 30-16-11, at 2,462 feet, as a gasser, 9,000,000 cubic feet; the Hodge Oil Company's Marshall No. 7, in 19-16-11, at 1,559 feet, was completed with initial production 35 barrels, and the Standard Oil Company's A. F. McDade No. 3, in 18-16-11, at 2,132 feet, was junked.

In Red River parish (Bull Bayou), the only completion was the Doan Oil Company's Nelson No. 12, in 6-12-10, at 2,787 feet, initial yield 43 barrels, and in De Soto parish (Bull Bayou) there were only two completions, namely: United Texas Petroleum Company's Giauque No. 1, in 8-11-11, at 2,705 feet, 15 barrels, and The Texas Company's Giauque No. 3, in 1-11-12, at 2,879 feet, a gasser with capacity of 100,000 cubic feet daily.

Daily Output Continues Falling Off With Few Important Showings

Staff Special
TULSA, Nov. 20

WITH crude oil production showing a decline from week to week (due more or less to which curtailment and credit restrictions) there is but little that lifts the past week out of the ordinary run of routine completions. Probably the most important event from a development standpoint in Oklahoma is the developing of a commercial producer in Duncan district, southwestern Oklahoma, of an old gas producer. In Okfuskee county another wildcat five miles east of Okemah, has all the earmarks of a commercial producer. In the proven areas there was a continuation of average completions, but in the Maramec district, what has heretofore been considered a likely territory, operators are disposed to show but slight attention to optimistic reports, as indications point to this territory proving more or less of a "flivver."

With statisticians of more or less national repute, computing or forecasting crude oil production for the state of Oklahoma, operators in this state are content to see the decline witnessed by the past two weeks, as Mid-Continent producing companies and individual producers have long been aware of the advisability of storing their crude oil under ground. In this connection it is interesting to note the well average of certain areas. The Hewitt field is showing a decided decline from October's average with a daily output of some 29,000 barrels from roughly 350 wells. In the Osage reservation the well average is slightly under 10 barrels, and the state's average per well computed from pipe line runs will not exceed 10 barrels per day.

Estimated daily crude oil production for Oklahoma is 302,000 barrels, divided among the following fields: Cushing, 33,800 barrels; Hewitt, 29,000 barrels; Healdton, 26,000 barrels; other fields, 214,000 barrels.

A wide divergence of opinion is noticeable in the estimation of average daily production for the state of Kansas. This is largely due to the amount of "cut oil" that is returned to producers for treatment. However, it is believed that from the sources of information available, an estimate of 100,000 barrels is fairly accurate. As an evidence of how utterly hopeless it is to estimate daily crude oil production from this state, it might be well to point out that the Covert-Sellers pool, according to pipe line runs just now available, is but roughly 7,000 barrels, and the Urschell pool and eastern extension of the Florence field are responsible for about a like amount.

Average daily crude oil production for Kansas for the past week is as follows: Eldorado-Peabody-Elbing-Florence, 67,000 barrels; Augsuta, 10,800 barrels; other fields, 21,000 barrels; total, 98,800 barrels.

Oklahoma Development

With routine completions in the older producing areas, there is but little in the past week's development to lift it out of the rut, with the exception of a commercial producer in the Duncan district of Cotton county, a Dutcher sand pumper in the Kelleyville district of Creek county, and a probable commercial producer in Okfuskee county, five miles east of Okemah.

Cotton County

In the Duncan district, the Butler and Choate Oil Corporation test on the Johnson farm in the northeast corner of the southwest of the northeast of Sec. 24-1S-9W, which was originally shut in as a 25,000,000-foot gas well, is now making 125 barrels of oil and 17,000,000 feet of gas. Scout reports indicate that this test has been spraying oil for some time, but now may be classified as a commercial producer. The No. 2 on the same lease is making 20,000,000 feet of gas from 1,739-57 feet.

Greek County

The National Exploration Company, Mid-Continent producing subsidiary of the Union Oil of Delaware, has apparently discovered a Dutcher sand producer in its wildcat in the northwest corner of the southwest of the northwest of Sec. 21-17-10, which found the top of the Dutcher sand at 2,642 feet and at 10 feet in is standing with 900 feet of oil in the hole. It will be shot. This wildcat showed for a small Glenn sand producer, but drilled into the pay without reducing the hole and failed to land the pipe, and drilled deeper. It is some distance from production.

Northwest of Sapulpa the H. F. Wilcox test in the center of the north line of the northeast of Sec. 14-18-10, found the top of the sand at 2,665 feet and is showing oil. It is setting casing in an effort to shut off water from what is thought to be the Wilcox sand. It is the first Wilcox sand showing in this territory.

In township 15, range 10, country, there were a number of large completions during the past week. The Twin State Oil Company (Oklahoma producing subsidiary of the Sun Company) No. 3 on the Smith farm, in the southwest corner of the northeast of Sec.25-15-10, is making 500 barrels in sand from 2,583-98 feet. Other completions, in what is termed the Slick field of over 100 barrels, were—the Selby Oil & Gas Company, No. 5 Robins farm, southwest corner of the southeast of the southwest of Sec. 10-15-10, found the top of the sand at 2,581 feet, and at 17 feet in is making 150 barrels, and the Benmo Oil Company No. 3 Trent, in the northwest corner of the southeast of the northwest of Sec. 16-15-10, is a 125-barrel producer, in sand from 2,689-2,722 feet.

In the Bristow district there is no change from last week's development, the two wildcats of the Wilcox Oil & Gas Company remaining practically the same. The one in 35-16-8 is still rated as a 100-barrel producer, in sand found from 3,175 feet with the tools in the hole. The other test in the northwest corner of the southwest of Sec. 28-16-9, status remains unchanged and the Elro Oil Company No. 3 in the southwest corner of the northwest of the northwest of Sec. 17-16-9 found sand from 2,650-78 feet, and is making 50 barrels.

Carter County

In the Hewitt field there is but little worthy of mention. On the Walker farm in Sec. 21-4S-2W, the western edge of the producing limit, the Humble Oil & Refining Company No. 4 in the northwest corner of the northeast of the northwest of this section, is pumping 67 barrels from 2,345-70 feet. Nos. 3, 5 and 6 are abandoned. In the light of the correlation of the Hewitt sand there is little likelihood of a further western extension, as a cross section of the producing horizons of this area shows a dip that precludes a possibility of a further extension of the western producing limit.

Despite a record of inside completions there is nothing in the present outlook to justify a prediction of this field's materially swelling the gross daily production of the state of Oklahoma, in view of the fact that average daily pipe line runs from this area show roughly 29,000 barrels. The only worth while extension in recent weeks is that of the No. 3 Walker, of Simpson, in the center of the northeast of the southwest of the southeast of Sec. 9-4S-2W, which is making 300 barrels, 50 feet in a 14-foot sand. Other large inside producers are: Wirt Franklin's No. 9, Schellenberger farm, center of the west line of the southeast of the southwest of Sec. 16-4S-2W, found sand from 2,315-38 feet, and is making 150 barrels; Westheimer & Daube No. 10, the center of the southwest of the southeast of the northeast of the same section, found sand from 1,498-1,538 feet, and is a 300-barrel producer; in the same

section the Magnolia Petroleum Company No. 1 Cruce farm, is a 100-barrel well from 1,340-1,400 feet; and in Sec. 21-4S-2W the Carter Oil Company No. 24, Noble farm, is swabbing 60 barrels from the 1,600-foot sand.

Osage Reservation

With the modification of the 4,800 acre rule in the Osage reservation, which permits of an individual company acquiring some 20,000 acres of land on the east side and an unlimited holding in the western Osage, there is every likelihood of an increase in drilling operations in the reservation, particularly as it pertains to the western division. Up to recent sales there has been a noticeable lack of interest in the western part of the Osage reservation, but there are a number of companies, such as the Carter Oil Company, that would show an alarming deficit in their operations in the reservation without their western development.

It is common knowledge that the Osage reservation will never pay out tract for tract, considering the bonus, rentals, and expense of drilling operations; but on the other hand ,there have been some signal profits from a few isolated cases, most of which, in the latter day, have been credited to the western division. Probably the greatest profit in latter days has been investment of the Gilliland Oil Company and the Gypsy Oil Company, who have pioneered the township 23, range 7 territory. The Gilliland Company is at this time showing probably the highest well average of any Osage producer. In the same part of the reservation the Carter Oil Company has gone a long ways to offset development cost in other areas, and it is no doubt true that the recent ruling of the Department of Interior will result in an intensive development of the reservation.

The Carter Oil test in the center of the south line of the northeast of Sec. 9-26-6 is now making 150 berrels daily. The discovery well on this tract, which has been making about 50 barrels per day, has succeeded in shutting off the water and is now good for 125 barrels daily.

In the territory opened up by the Gilliland Oil Company and the Gypsy Oil Company, the Gilliland No. 7 in the southwest corner of the northwest of the southeast of Sec. 26-23-7, is making 900 berrels from 2,779-2,805 feet, and the company's No. 11 on the same tract, which was completed about one month ago, as a 1,000-barrel producer, is now making roughly 600 barrels.

Maramec District

The latest development in this district is the White Oil Corporation test on the Maramec Park allotment in the northeast corner of Sec. 5-20-6. It is still standing 17 feet in what is believed to be the Skinner sand found at 2,960 feet. The latest report shows 50 barrels of fluid on the pump, mostly water.

Offsetting the Pierce Oil Corporation's Bartlesville sand producer, southeast of Maramec, the Buttram test in the northeast corner of the northwest of the southwest of Sec. 16-20-6 is making 8,000,000 feet of gas from the Peru sand horizon, found at 2,812-32 feet.

Kansas

With the major producing companies estimating daily production of the Covert-Sellers-Urschell pool eastern extension of the Florence pool as some 22,000 barrels daily, pipe line runs for these fields for the month of October show a decided disappointment, in that the combined production is roughly 14,000 barrels daily. This, however, may be attributed to two causes: first, the rejection of "cut-oil" by purchasing agents, and inadequate pipe line facilities, which forces producers in the Urschell pool to swab their wells on about a 50 per cent basis. This fact, however, may prove a blessing in disguise, as it is common knowledge to those acquainted with the characteristics of Kansas producing fields that there is a thin line of demarkation between the oil sand and salt water, and it has been the history of most of this state's producing areas that continual pumping or swabbing has resulted in a material water encroachment, which has eventually drowned out the productivity of these fields.

In south Butler county, Kansas, the B. & G. Oil Company test on the Lenz farm, in the center of the east line of the southwest corner of the northwest quarter of Sec. 1-29-5E, a half mile in advance of production to the north, found the top of the sand at 2,785 feet and is standing full of oil one foot in the pay. It is expected to make a 50-barrel producer. In the Covert-Sellers field, Ward & Tucker No. 3, in the northeast corner of the south half of the northwest quarter of Sec. 28-21-4, has been completed in the regular sand as a 500-barrel producer.

In the Urschell pool, eastern extension of the main Florence field, the Robinson Oil Company test on the Seibel farm, in the northeast corner of the south half of the northwest quarter of Sec. 20-21-5 found the top of the pay at 2,260 feet and filled up with oil. It extends the field a quarter of a mile to the south.

In the Rosalia district the Kansas & Gulf Company test on the Long farm in the southeast corner of the northeast quarter of Sec. 21-26-7 has been plugged in and abandoned. This test was on the sand when the 5-inch casing parted while being run and became jammed in the hole. The Kansas & Gulf has skidded the rig for another test.

Pipeline Runs For Greater Okmulgee District Shows 12 Barrel Well Average

Staff Special

TULSA, Nov. 20.—Pipe line runs for the Greater Okmulgee district, comprising Okmulgee, Muskogee, McIntosh and Okfuskee counties and the "Outside Creek Nation Development Area" (Cushing excluded), for the month of October show an average daily production of 95,246 barrels from 11,053 producing wells, or a daily well average of, roughly, 8 barrels.

Despite the large caliber Wilcox sand producers of such pools as the Phillipsville and the 11-41-11 and other small prolific pools which have characterized the Greater Okmulgee district, this territory is giving up, roughly, 56,000 barrels of crude oil daily from slightly over 4,500 producers, or an average of 12 barrels per well.

In the famous Glen pool, which is included in the "Outside Creek Nation Development Area," production has declined to 13,685 barrels daily. This wonderful field was at one time credited with a daily production of more than 300,000 barrels.

The following table shows the pipe line runs of the Greater Okmulgee district and the "Outside Creek Nation Development Area" by districts for the month of October, with pipe line companies handling the oil, number of wells, and daily production.

Company	No. Wells	Daily Prod.
PIPE LINE RUNS FOR GREATER OKMULGEE DISTRICT		
Prairie Pipe Line	1,181	8,439
Texas Pipe Line	892	11,995
Empire Pipe Line	441	5,134
Sinclair Pipe Line	369	920
Gulf Pipe Line	278	903
Crown Pipe Line	172	250
Pierce Oil Corp	36	126
Allied Refining	2	2
Lake Park Refining	43	2,415
Cosden Pipe Line	317	5,581
C. B. Shaffer Pipe Line	56	267
Indiahoma Refining	84	4,320
Phillips Highway Refining	7	6,514
Producers & Refiners Corp	28	4,480
Sapulpa Refining	.....	2,000
Wooster Oil	14	42
Transcontinental Oil	211	923
Oklahoma Producing & Refg.	403	1,925
Total	4,534	56,236
JENKS DISTRICT—TULSA COUNTY		
Prairie Pipe Line	529	1,157
Gulf Pipe Line	372	816
The Texas Pipe Line	260	533
Sinclair Pipe Line	15	66
Cosden Pipe Line	4	19
Total	1,180	2,591
RED FORK DISTRICT—TULSA COUNTY		
Prairie Pipe Line	225	1,168
The Texas Pipe Line	259	313
Gulf Pipe Line	40	101
Cosden Pipe Line	17	20
Phoenix Refining	8	20
Total	549	1,622
GLEN POOL—CREEK AND TULSA COUNTIES		
Prairie Pipe Line	808	2,653
Gulf Pipe Line	1,259	8,044
Texas Pipe Line	105	608
Sinclair Pipe Line	212	998
Cosden Pipe Line	163	1,292
Phoenix Refining	28	90
Total	2,575	13,685
BIXBY DISTRICT—TULSA COUNTY		
Prairie Oil & Gas	100	523
Gulf Pipe Line	9	13
Cosden Pipe Line	131	312
Constantine Refining	14	28
Sinclair Pipe Line	108	252
Total	362	1,128
BROKEN ARROW DISTRICT—WAGONER AND TULSA COUNTIES		
Prairie Pipe Line	99	457
Cosden Pipe Line	52	92
Empire Pipe Line	71	165
Oneta Refining	94	440
Constantine Refining	13	45
Total	329	1,199
STONE BLUFF AND LEONARD DISTRICTS—TULSA, MUSKOGEE, WAGONER AND OKMULGEE COUNTIES		
Prairie Pipe Line	111	330
Sinclair Pipe Line	71	281
Constantine Refining	74	465
Cosden Pipe Line	89	416
Empire Pipe Line	70	356
Total	415	1,848
MOUND DISTRICT—TULSA, CREEK AND OKMULGEE COUNTIES		
Prairie Pipe Line	227	1,486
The Texas Pipe Line	509	5,494
Gulf Pipe Line	199	2,773
Shaffer Oil & Ref	7	160
Indiahoma Refining	11	550
P. & R. Corp	6	55
Empire Pipe Line	22	330
Cosden Pipe Line	107	5,437
Sapulpa Refining	21	652
Total	1,109	16,937
RECAPITULATION		
Greater Okmulgee District	4,534	56,236
Jenks District	1,180	2,591
Red Fork District	549	1,622
Glen Pool	2,575	13,685
Bixby District	362	1,128
Broken Arrow District	329	1,199
Stone Bluff District	415	1,848
Mound District	1,109	16,937
Grand Total	11,053	95,246

Wells Pinched Down In Mexico As Salt Water Continues To Appear

Staff Special
HOUSTON, Nov. 20

ALTHOUGH the previously published export figures for the Tampico district, covering the month of October, showed a recession of only about 200,000 barrels for the period under the September record exports of 17,311,000 barrels, it was apparent at the beginning of November that the Los Naranjos territory would be unable long to maintain its part of the production going to make up three-fourths of the shipments out of Mexico each month. The remainder of roughly 150,000 barrels, daily average, is produced in the Panuco (heavy oil) district.

Every week now finds one or more wells on the Chinampa hacienda, north part of the Los Naranjos "high spot," developing salt water to some degree. The latest well to be reported pinched down is that of the Compania Metropolitana de Oleoductos, S. A. (Island Oil & Transport Company) on Lot 135, Chinampa, which however was slowed down only from approximately 26,000 to 22,000 barrels daily after showing two-tenths of one per cent. The same interests abandoned on November 5 their No. 4 drilling well on Lot 114, at about 1,700 feet. Lot 114 is in the heart of the Chinampa water encroachment zone and adjoins Lot 97, where National Petroleum News previously reported Transcontinental Petroleum Company's No. 2 well shut in November 6, at which time it was making 7,000 barrels, 12 per cent emulsion and two per cent clear salt water.

Denial is given a report current in Mexico that the Mexican Gulf Oil Company's wells on Lot 251, Amatlan hacienda, Los Naranjos district, are making salt water. It was reported in Tampico that Nos. 2 and 3 had each shown two-tenths of one per cent of emulsion, a harbinger in the flush Mexican fields of impending water encroachment. No. 2 was rated in these reports as producing 11,500 barrels of light Mexican crude daily, and No. 3 was credited with 24,000 barrels, flow.

Los Naranjos Production

Thirty-four wells in the Los Naranjos district of the lower country of Mexico were being flowed November 1 (a few of these figures being revised to take into consideration pinching down of wells that were done as late as November 6) approximately as follows, daily well averages being given by companies:

Company	No. Wells	Per Well Average
Mexican Eagle Oil Co. (Aguila)	9	11,200
Cias. del Agwi (Joseph F. Guffey)	3	15,270
Buckley et al	2	5,125
Continental Mex. Pet. Co. (General Petroleum Corp.)	1	10,000
Empire Gas & Fuel Co. (Doherty)	1	15,000
Huasteca Petroleum Co. (Doheny) New Zacamixtle district	1	Shut-in*
International Petroleum Corp. (John Hays Hammond)	2	17,000
Cia. Metropolitana de Oleoductos, S. A. (Island Oil & Transport Co.)	1	22,000
Mexican Gulf Oil Company (Gulf Oil Corporation)	3	13,350
Mexican Sinclair Oil Corp.	4	10,000
The Texas Co., of Mexico, S. A.	2	13,500
Transcontinental Petroleum Co. (Standard of New Jersey)	3	26,300
Union Oil Company of California	1	20,000

*Zacamixtle "discovery" well rated potentially at 80,000 barrels daily but which normally would be flowed not to exceed 40,000 to 50,000 barrels daily; table does not include Huasteca's Cerro Azul well, beyond Zacamixtle on another high spot along the 40-mile knife edge fold between Tepetate and Alamo, which Cerro Azul well is being flowed at rate of about 32,000 barrels daily.

It will be apparent from the foregoing that the average daily flow being taken from the 34 wells, November 1, was in excess of 13,000 barrels, and that the total oil being produced was on the basis of this compilation, 443,710 barrels daily.

A survey of the pool, however, gives this slant to be considered in connection therewith: both the Union Oil Company of California and the Empire Gas & Fuel Company wells are on Lot 114, where one of the Buckley, Wooletts & Thompson wells has shown as high as 8 per cent salt water, both of the Buckley et al wells having been affected; at least one of the Agulia wells, on Lot 213 Amatlan, had been pinched down about the time the compilation was made; one of the International Petroleum Company wells was pinched down because of salt water encroachment, altho still producing; one Mexican Gulf Oil Company well, on Lot 95, Chinampa, was closed in when salt water appeared so that a revision would leave only two producing wells as against the three shown; Transcontinental Petroleum Company's, Lot 97 well, shut in November 6 while making 7,000 barrels of oil, calls for further revision of the foregoing compilation, so that the situation looks anything but bright to the oil operator experienced in conditions governing the light oil fields of Mexico.

It is true that the figures given in the foregoing are the production figures, that is to say the quantities of crude the wells are being allowed to flow as distinguished from the much greater "potential production" that these wells are rated with when they are first completed. But wells in Mexico are never allowed to make their "maximum potential" for the reason that such a "pull" upon the underground sources of supply would (in the very nature of flush fields underlaid by a water table upon which the petroleum rides) create a vacuum sucking the salt water into the oil prematurely.

Crediting the Huasteca's new Zacamixtle "discovery" with say 40,000 barrels as probably the maximum it would be allowed to flow and taking cognizance of the 32,000 barrels daily coming from the Cerro Azul well of the same interests, present production of the Mexican light oil districts (including Los Naranjos at the 443,710 barrels shown by the foregoing compilation) would be somewhere around 500,000 barrels daily.

That exports failed to show a falling off of more than 200,000 barrels daily for the entire month of October as compared with the record September movement is responsive to the fact that the pinching down of wells as a result of salt water encroachment did not come to any considerable extent until the latter part of the month, besides some wells that were pinched down were offset by the taking of greater quantities from wells higher up on the structure where the perils of encroachment will be the last to appear and where the maximum quantity of oil safe to be flowed had not been previously taken.

Now with the number of wells showing salt water that have been reported numbering about a third of the total producing in the Los Naranjos territory, the operator experienced in Mexico is prepared for the worst. He knows that while a lot of oil will be produced yet, still the period in which it can be produced before the wells already encroached upon have to be shut in entirely is short and he knows further that with the encroachment advanced as far as it has gone it is but a question of time until the wells higher up on the structure also feel the effects of water.

Must Get New Supply

What the operating interests consider the most important at this time is to obtain new sources of supply. The apparent source is the next Zacamixtle territory, with one Huasteca and one Aguila (Mexican Eagle) well producing. But it takes time to complete wells and still longer to build to the wells the necessary facilities to take out the production. That there must be a slump in exports in that period is readily recognized in Mexico, and it is current opinion in Tampico, as expressed by the **National Petroleum News** correspondent in the November 10 issue, that the Chinampa division of Los Narranjos will do well to last another three months. Certainly it is on its "last legs," so to speak, a factor governing not only the Mexican situation but the American heavy crude market as well.

The Chinampa situation, coupled with the appearance of salt water in the two West Columbia (Gulf Coastal Texas) wells of The Texas Company, which has been making roughly 60 per cent of the recently possible 65,000 barrels daily at West Columbia, is considered in the southwest by competent observers to go further than anything else toward stabilizing the domestic heavy crude market.

The director of the Banque de la Seine is reported to be in London arranging the details for the organization of a $20,000,000 company for the purpose of carrying on the oil business in France.

Mid-Continent Operators Not Surprised At Secretary Payne's Decision

By J. B. Gambrell, Jr.

Editorial Manager Mid-Continent Bureau

Staff Special
TULSA, Nov. 24

IN the light of their past experience with the present administration, particularly of the Interior Department, operators in the Mid-Continent field are not surprised at the "hair-splitting decision" handed down by that department following the "4,800-acre hearing," held in Washington before Secretary John Barton Payne on November 16. The decision, which incidentally, was, and still is, so involved that it was necessary for the Secretary of the Interior to issue a revised or interpretative decision, is on a par with other actions taken by this national administrative branch in dealing with matters affecting the oil industry.

When the first announcement of the secretary's decision was made public in Mid-Continent oil circles there was a grand rush to secure the services of "Philadelphia lawyers" to interpret just what the Interior Department had in mind. The following telegram from Harry H. Smith, secretary of the Mid-Continent Oil & Gas Association, is the clearest version up to date:

"Osage Oil & Gas Lessees Association,
"505 Cosden Bldg., Tulsa, Okla.

"Following is revised decision:

"On November 18 the Secretary of the Interior decided to abrogate the 4,800-acre limitation on the west side of the Osage; to modify it on the east side by extending the limit to 20,000 acres; and in the western tribes by increasing the limit to 9,600 acres. On the west side of the Osage, assignments may be taken without limitation; on the east side any lessee may complete or acquire by lease or assignment a quota of 4,800 acres as heretofore; such lessee may then acquire by assignment and without restriction as to size of wells, not to exceed 2,400 acres; thereafter assignments to such lessee will only be permitted where the wells on the lease assigned are not capable of averaging more than three barrels a day; provided that the total permissable acreage on the east side shall not exceed 20,000 acres."

(Signed) H. H. Smith.

While the foregoing decision no doubt will accelerate bidding greatly at future Osage sales, and will necessarily give an added impetus to drilling operations, it is far from what Mid-Continent operators sought, as an analysis of the economic phases governing development at this time shows that the relief Osage lessees really desired and needed is not an illimitable amount of undeveloped acreage, but the removal of producing properties from the 4,800-acre limitation. This is particularly true when it is remembered that Osage leases obligate the lessee to commence operations within a given period of time, and with the present crude oil situation operators are not desirous of obligating themselves to develop excessive amounts of acreage, as it has been the well known policy of the major producing companies of Mid-Continent over since the beginning of the financial stringency, to restrict drilling operations to a minimum.

What would probably have been the most acceptable modification of the 4,800-acre rule as it pertains to the Osage Reservation to the majority of the large producers in this territory, would have been an extension of probably 9,600 acres on both the east and west side, and the lifting of producing properties from the departmental limitation.

Under the revised decision, operators holding 4,800 acres on the east side may acquire by assignment 2,400 acres more, regardless of the caliber of producer, but thereafter will only be permitted to purchase producing acreage where the daily well average is three barrels or less.

There are at this time 1,418 producing tracts in the Osage Reservation, 274 of which show a daily well average of three barrels or less; 977 show a higher well average, and the record on 167 is not available, or 28 per cent of the known producing leases are affected by the latest modification on the three barrel per well per day phase. These 274 tracts comprise roughly 33,840 acres, as against a total of 450,779.10 acres under lease for oil development.

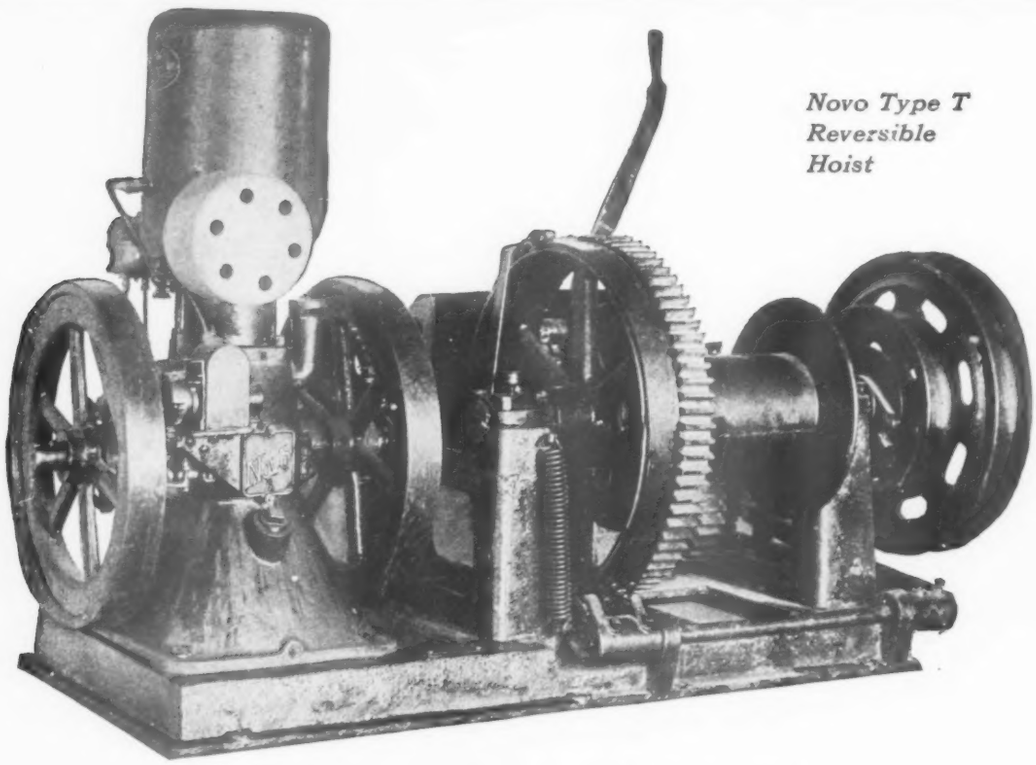
The following table shows the gross production of the entire Osage Reservation by quarter sections, company, production by lease, number of wells, and daily well average for the month of September, showing clearly the effect of the departmental ruling as it relates to the Osage Reservation:

Lease	Gross Production	No. Wells	Per Well Per Day Average
Atlantic Oil Producing Co.			
SE 13-22- 8	1,839.72	7	8.76
NW 31-23- 8	4,701.50	4	39.18
SE 31-23- 8	None	..	.....
SW 1-22- 9	134.18	4	1.12
Arbon, B. J.			
NW 33-26-12	1,147.06	5	7.65
NE 33-26-12	128.42	19	.225
NW 34-26-12	259.18	4	2.16
Ashland Oil Co.			
NE 17-22-11	1,118.37	2	18.64
SE 13-23-11	None	..	.....
SW 13-23-11			
SE 14-23-11	335.42	6	11.18
SE 15-23-11	2,798.20	5	18.65
Ashland Oil Co. et al			
SW 14-23-11	5,335.87	9	19.76
Barnsdall Oil Company			
SW 1-21- 8	736.62	10	2.68
SE 2-21- 8	135.08	2	4.5
SW 18-21- 9	340.88	5	2.27
SW 20-21- 9	971.22	12	2.70
NW 30-21- 9	1,500.68	8	6.25
NE 30-21- 9	4,399.54	14	10.48
NW 20-29- 9	2,363.57	13	6.06
NW 4-21-10	7,638.71	37	6.88
SE 13-22-10	349.27	4	2.91
NE 13-22-10	544.78	7	2.58
NE 27-22-10	210.55	6	1.17
SW 24-22-10	1,900.96	11	5.76
NE 35-22-10	708.66	9	2.62
SW 30-24-10	1,040.62	7	4.91
SW 24-23-11	2,229.55	11	6.76
NE 30-23-11	139.80	7	.67
SE 30-23-11	143.76	8	.60
SW 28-24-11	542.35	6	3.01
SE 30-25-11	1,180.27	12	3.28
NE 31-25-11	827.41	6	4.60
NE 36-25-11	None	.....	.....
SE 17-27-11	84.16	1	2.81
SW 19-27-11	142.54	2	2.38
SE 20-27-11	69.92	4	.58
NE 20-27-11	184.24	4	1.54
NE 4-20-12	2,894.83	18	5.36
SE 4-20-12	2,952.31	12	8.20
NW 4-20-12	2,443.52	14	5.82
SW 4-20-12	1,953.82	10	6.51
SE 5-20-12	778.94	7	3.71
SW 5-20-12	697.50	5	4.65
SW 8-20-12	580.67	3	6.45
NW 8-20-12	2,389.97	8	9.71
NW 9-20-12	3,760.14	17	7.37
SW 14-20-12	83.70	3	.93
SE 15-20-12	1,190.51	14	2.83
NE 22-20-12	1,192.43	19	2.09
NW 23-20-12	48.54	2	.81
SE 3-21-12	964.97	10	3.22
NE 10-21-12	672.07	11	2.03
SE 10-21-12	364.31	5	2.43
NW 29-21-12	2,924.96	13	7.42
SW 29-21-12	3,467.66	15	7.71
SE 29-21-12	2,421.16	16	5.04
NE 30-21-12	3,869.82	17	7.39
SE 30-21-12	3,559.46	15	7.91
NE 31-21-12	3,903.36	21	6.20
NW 32-21-12	2,033.05	15	4.52
NE 34-22-12	586.46	6	3.26
NW 8-23-12	343.30	11	1.04
Barnsdall & Leahy			
SE 34-26- 9	175.03	1	58.34
Barnsdall Oil & McWilson			
SW 10-21- 9	162.15	1	54.05
Barnsdall & A. Morris Herkness			
SW 4-24-11	None	.....	.....
Barnsdall & Neenah Oil			
NE 15-27-10	187.78	4	1.56
SW 15-27-10	70.12	1	2.34
Barnsdall Oil & Osage Dev. Co.			
NW 4-24-10	174.96	2	2.92
NE 35-29-11	15,013.26	6	83.41
NW 35-29-11	394.61	1	131.54
Barnsdall Oil & Plover Drlg. Co.			
NE 35-25-11	688.24	1	22.94
Barnsdall, Devonian Sonne-Echo & Leonard Drilling Co.			
NW 15-25-11	79.58	1	2.98
Barnsdall Oil Co. et al			
SW 19-25-10	182.20	1	6.07
Barnsdall Oil Co. & Sonne			
SE 25-25-10	355.50	9	1.32
NW 13-25-11	359.94	2	6.00
NE 14-25-11	3,467.82	12	9.63
NW 14-25-11	None	.....	.....
SE 24-26-11	588.66	10	1.96
SE 16-29-11	277.88	10	.93
SW 10-25-12	118.39	3	1.32
NW 15-25-12	555.49	17	1.09
NE 16-25-12	168.13	8	.70
Barnsdall & Larkin			
NE 23-24-10	148.26	1	4.94
Bell Oil & Gas Co.			
NE 1-26-10	78.27	2	1.30
SE 20-24-12	125.82	2	2.10
Brenner Oil Co.			
SW 16-20-12	474.44	5	3.16
NE 29-21-12	4,425.65	8	18.44
Breene, McKinney & Foster			
SE 7-27-11	170.32	1	5.68
NE 18-27-11	1,478.98	5	9.86
Canadian Oil & Gas Co. & Advance Oil Company			
SW 20-29- 9	527.94	.....	.....
Celestine Oil Co.			
NW 1-26- 9	191.52	1	6.38
NW 30-26-10	378.33	1	12.61
Dahlgren & Blue			
NE 2-25-11	1,036.97	2	17.28
Dahlgren & Blue and Boston & Blue			
NW 16-25-11	397.26	4	3.31
NW 27-25-11	None	.....	.....
NE 27-25-11	172.64	2	2.88
NW 18-25-11	369.34	3	4.10
NE 25-25-11	None	.....	.....
NW 25-25-11	2,030.56	7	9.67
NE 3-24-12	76.75	3	.85
NW 3-24-12	180.51	3	2.00

Lease	Gross Production	No. Wells	Per Well Per Day Average
Depositors Oil & Gas Co.			
SW 32-28- 8	172.36	1	5.75
Devonian Oil Co. Echo & A. W. Leonard Drilling Co.			
NW 21-23-11	5,041.44	7	24.01
Devonian Oil Co.			
NE 3-20-12	60.00	1	20.00
SE 3-20-12	195.89	5	1.31
NE 10-20-12	756.49	11	2.29
NW 20-20-12	559.20	5	3.72
Duffield, L. C., & McKeon			
SW 35-29-10	386.30	7	1.84
NW 35-29-10	224.20	4	1.87
Durham, E. A.			
NW 30-27-11	981.98	9	3.64
Equa Oil Co.			
NW 17-25-10	77.24	.....	.....
Enterprise Transit Co.			
SW 31-25-11	240.42	3	2.67
SW 29-27-12	70.80	2	1.18
Evidence Oil Co.			
SE 27-28-10	203.00	1	67.67
Fifty-Nine Osage Oil Co.			
NW 9-24-12	23,905.79	.....	.....
NE 9-24-12	4,284.91	.....	.....
NE 7-24-12	.....	.....	.....
NW 8-24-12	366.22	.....	.....
NW 6-23-11	None	.....	.....
NE 30-27-11	40.68	.....	.....
Fifty-Nine Osage & Foster			
SE 7-24-12	.....	.....	.....
SW 8-24-12	359.13	.....	.....
SE 8-24-12	1,156.33	.....	.....
SW 9-24-12	1,435.70	.....	.....
SE 9-24-12	177.94	.....	.....
Finance Oil Co.			
SE 25-24-10	731.12	3	8.12
NE 31-23-11	186.99	6	1.04
NW 32-23-11	367.66	5	(5) 2.45
NE 32-23-11	1,613.78	9	5.98
NE 33-23-11	1,255.26	11	3.89
NW 33-23-11	1,785.22	7	8.50
Finance Oil & Franchot			
NW 1-21- 9	73.16	1	24.38
Finance & N. V. V. Franchot			
SE 2-21- 9	296.44	1	9.88
NW 2-21- 9	189.52	3	2.11
NE 2-21- 9	75.00	1	25.00
Finance Oil Co. & Leahy Oil			
SW 19-23- 9	3,030.20	16	6.31
S½NW, NWNW, W½ NENW 30-23-9	120.00	2	2.00
Flesher Pet. Co.			
SE 1-22- 9	159.00	1	5.3
Finance Oil & Foster & Davis			
SE 19-21- 9	484.57	9	1.79
SW 19-21- 9	107.69	2	1.79
NW 19-21- 9	215.36	4	1.79
NE 19-21- 9	107.68	2	1.79
Finance Oil & Livingston			
NW 25-23-11	142.44	3	1.58
NE 25-23-11	62.84	2	1.05
NE 26-23-11	189.84	2	3.17
Finance Oil & Central States Oil			
NE 13-24- 9	1,940.42	3	21.23
SW 35-26- 9	1,943.77	7	9.26
Foster, H. V.			
SE 25-25- 9	6,091.27	8	25.38
SW 25-25- 9	1,890.79	9	7.00
NW 25-25- 9	28,715.08	9	106.35
NE 25-25- 9	700.34	.....	.....
NE 13-27-10	291.37	1	9.71
SE 13-27-10	277.68	2	4.63
Foster & Davis			
SW 36-24- 8	432.76	5	2.89
NW 36-24- 8	865.52	16	1.80
NW 2-26-10	891.73	7	4.25
SW 35-27-10	445.86	4	3.72
Foster & Leach			
W½ 2-28-10	266.94	4	2.23
SE 2-28-10	65.74	2	1.10
Foster & Norwood Oil Co.			
SW 23-29- 9	79.12	2	1.32
NW 23-29- 9	244.82	5	1.63
SE 14-24- 9	11,394.80	8	47.48
NE 23-24- 9	1,139.06	6	6.33
SE 23-24- 9	2,740.60	7	13.05
SW 23-24- 9	None	.....	.....
NE 28-26-11	186.44	2	3.10
NE 29-25-11	583.51	6	3.24
NW 29-25-11	939.18	12	26.09
NE 30-25-11	3,875.88	19	6.85
NW 30-25-11	1,485.27	10	4.90
Friedman, Louis et al			
SW 14-24- 9	3,353.47	.....	.....
Fitzgerald, John W.			
NE 29-27-12	129.22	.....	.....
Gilliland Oil Co.			
SW 23-23- 7	1,208.80	3	13.43
NW 23-23- 7	1,170.72	1	39.02
NE 23-23- 7	409.20	1	13.64
SE 26-23- 7	1,140.20	7	5.43
Garnet Oil Co.			
NE 4-25- 9	375.20	1	12.51
NE 10-25- 9	704.56	1	23.49
SE 10-25- 9	711.92	3	7.91
Garnet Oil Co. & Wolverine Oil Co.			
NE 14-25- 9	372.79	1	12.43
Gillespie, Steinberger & Lucas			
NW 21-22-11	1,334.89	5	8.90

Lease	Gross Production	No. Wells	Per Well Per Day Average
Gypsy Oil Co.			
NE 1-21- 7	58,690.11	32	61.03
SE 1-21- 7	5,073.12	14	12.08
SW 1-21- 7	938.57	5	6.26
NW 1-21- 7	425.96	2	7.10
NW 6-21- 8	2,984.70	13	7.65
SE 24-25- 9	4,056.24	1	135.21
SW 16-21-10	1,704.08	7	8.11
SE 16-21-10	376.22	3	4.18
SW 29-25-11	358.36	3	3.98
Gypsy Oil Co. et al			
NW 20-22-10	15,914.42	9	58.94
Hadley, John R.			
SW 14-29-11	2,928.06	4	24.40
SE 15-29-11	1,962.42	8	8.18
Hazlett, R. H.			
SW 26-23-11	4,560.00	6	25.33
NW 35-23-11	840.00	3	9.33
Hector Oil Co. & Lawson			
SE 26-27-11	None	.....	.....
Henry Oil Co.			
NW 3-21-12	2,529.48	13	6.49
Hivick & Essley			
NE 4-22-11	554.20	.....	.....
NE 8-23-11	2,892.04	.....	.....
Hill, J. R.			
SE 20-24-11	None	.....	.....
SW 21-24-11	409.28	6	2.27
SE 21-24-11	204.94	4	1.71
Homaokla Oil Co.			
NW 16-21-10	2,446.50	7	11.65
Hornecker & Johnson			
NW 6-26-10	764.52	.....	.....
Imperial Osage Dev. Co.			
NW 6-26-11	73.29	.....	.....
NE 33-27-11	249.51	7	1.19
SW 17-23-12	1,591.02	9	5.89
SE 17-23-12	183.72	8	.77
SE 18-23-12	6,275.76	11	19.02
SW 18-23-12	35.29	1	1.18
Indian Terr. Ill. Oil Co.			
SW 3-22- 9	177.80	3	1.98
SE 35-22- 9	170.28	3	1.89
SW 35-22- 9	None	.....	.....
SW 36-22- 9	434.00	5	2.89
SE 36-22- 9	357.92	3	3.98
SW 13-24- 9	580.78	3	6.45
SE 26-25- 9	None	.....	.....
NE 36-25- 9	8,627.79	8	35.95
NW 36-25- 9	2,104.62	9	7.79
SE 36-25- 9	881.48	2	14.69
SW 36-25- 9	3,580.66	3	39.79
NW 26-22-10	373.72	9	1.38
NE 26-22-10	743.12	12	2.06
NE 36-22-10	10,516.61	9	38.95
NE 3-26-10	1,021.12	13	2.62
NE 20-25-11	3,531.75	15	7.85
NW 20-25-11	1,098.00	5	7.32
NW 18-27-11	3,958.56	17	77.42
SE 32-27-12	647.03	6	3.59
SW 32-27-12	210.96	3	2.34
Jackson, Wise & American Pet.			
NW 14-28-10	352.13	4	2.94
NW 32-25-11	90.40	1	3.01
Jones, Huffman & Martin			
SW 17-29-12	124.68	.....	.....
Johnson & Cobleigh			
SW 28-26-12	1,464.63	.....	.....
Jennings, R. G.			
SW 35-27-11	None	.....	.....
NE 14-28-10	242.22	.....	.....
King, Hugh, Jr.			
SW 24-25-11	1,968.18	.....	.....
Kansas-Oklahoma Consolidated			
NE 21-29-11	423.87	.....	.....
Kasoma Oil Co. & Warren Pet.			
SE 36-27-11	1,483.35	2	24.72
Kennedy & Kennedy			
SE 22-20-12	1,217.77	14	2.90
Kennedy & Kennedy et al			
SW 20-20-12	245.86	.....	.....
Kewanee Oil & Gas Co.			
NE 6-26-10	248.74	1	8.29
NE 5-22-11	3,162.49	1	105.42
SE 33-23-11	72.16	1	2.41
NW 5-20-12	1,961.47	12	5.03
SW 17-21-12	565.09	2	9.42
SW 19-21-12	263.15	4	21.93
NW 20-21-12	659.90	4	5.50
NE 20-21-12	3,470.10	16	7.23
NW 21-21-12	198.69	1	6.62
SW 28-21-12	5,787.60	21	9.19
NW 28-21-12	6,033.05	8	25.14
Lahoma Oil & Gas Co.			
NE 9-26-12	135.30	.....	.....
NW 15-26-12	176.64	.....	.....
NW 16-26-12	188.94	.....	.....
NE 16-26-12	789.04	.....	.....
Landon, A. M.			
SE 25-25-11	1,091.72	6	6.07
SW 34-27-11	188.44	2	3.14
SW 28-27-12	514.68	4	4.29
SW 29-27-12	1,213.51	12	3.37
Landon & McMahon			
SE 16-28- 9	328.22	3	3.65
Laurel Oil & Gas Co.			
SW 5-23-12	734.04	21	8.16
SE 6-23-12	970.93	18	17.98
LeFever, E. W.			
NE 1-28-10	378.30	4	3.15

Lease	Gross Production	No. Wells	Per Well Per Day Average
Lucas & Steinberger			
NE 20-22-11	1,073.22	8	4.47
Neenah Oil Co.			
NW 4-24-11	1,107.50	.....	.....
NE 5-24-11	1,432.18	.....	.....
Mallory & Stewart			
NW 24-29-10	287.44	6	1.60
SW 24-29-10	.....	1	.....
Markham, John H., Jr.			
NE SE 23-21-8	167.54	1	5.56
NE 32-27-12	731.62	10	2.44
Manhatten Oil Co.			
NW 25-24-11	1,070.21	19	1.88
NE 25-24-11	1,344.92	17	2.63
NE 26-24-11	1,196.22	14	2.85
NW 27-24-11	1,050.87	13	2.69
NE 27-24-11	247.22	3	2.74
SE 19-25-11	3,163.41	19	5.55
SW 19-25-11	188.12	1	.....
SW 20-25-11	4,129.86	25	5.50
SE 20-25-11	5,156.55	22	7.81
SW 21-25-11	2,229.75	6	12.38
SW 31-27-11	331.83	2	5.51
SE 31-28-11	77.48	1	2.58
SE 33-27-11	206.57	1	6.88
NE 15-24-12	94.38	2	1.57
NW 15-24-12	1,746.45	9	6.47
NE 17-24-12	179.00	9	.66
NE 18-24-12	147.09	2	2.45
NW 18-24-12	22.56	2	.37
SW 34-25-12	171.74	2	2.86
Josey Oil Co.			
SW 30-27- 8	1,868.75	2	31.14
SW 25-24- 9	1,850.65	8	7.71
Minnehoma Oil Co.			
NW 14-26- 8	804.02	.....	.....
NE 12-26- 8	388.88	.....	.....
NE 30-22- 9	277.56	.....	.....
SE 28-24-11	126.76	.....	.....
Midland Oil Co.			
NE 19-22-11	1,411.22	6	7.84
NE 21-22-11	530.43	2	8.84
NW 21-22-11	719.24	5	4.79
Midland Oil Co. & D. E. Golier			
NW 3-26-12	1,238.96	8	5.16
NE 4-26-12	40.36	.....	.....
NE 5-26-12	706.64	4	5.88
NW 5-26-12	1,413.27	10	4.70
Montie Oil Co.			
NW 36-27-11	485.66	.....	.....
Mosier, W. T.			
SE 11-23-11	129.99	1	4.33
McBride, A. P.			
SE 26-22-10	34.08	2	.56
SW 26-22-10	34.08	5	.23
McGill & Elliott			
SE 36-21-11	65.27	.....	.....
McCune, C. L. (Lewis Oil Co.)			
SE 3-24- 9	None	.....	.....
McClintock, H. H., Trustee			
NE 35-27-11	1,497.61	11	4.54
McMan Oil & Gas Co.			
SE 28-23-11	419.81	.....	.....
Mason & Phillips			
SE 3-24-12	50.00	1	1.66
SW 3-24-12	539.80	5	3.59
SE 4-24-12	3,015.12	2	50.25
SW 4-24-12	18,927.72	4	157.73
Osage Indian Oil Co.			
SE 17-26-11	1,506.12	.....	.....
Osage Natural Gas Co.			
SE 8-22-12	None	.....	.....
Osage Development Co.			
NE 19-24-10	767.78	4	8.38
Osage Arrow Oil Co.			
SE 14-22-10 NE 14-22-10	924.86	.....	.....
Oliphant & Evicence Oil Co.			
NE 5-22-12	154.36	1	5.15
Osage Foraker Oil Co.			
NE 19-20-12	411.14	4	3.24
Osage Oil & Refining Co.			
NE 23-22-10	577.08	.....	.....
Oklahoma Natural Gas Co.			
SE 22-20-12	166.68	.....	.....
Osage Producing & Ref. Co., Schoenfeld & Markham			
SW 26-21- 9	186.78	1	6.22
Papoose Oil Co.			
NW 3-26-10	767.50	.....	.....
Parish & Beren			
NE 15-20-12	239.22	.....	.....
Peters, Chas. B.			
SW 33-23-12	164.31	.....	.....
Peters & Wrightsman			
SE 18-29-12	875.00	4	7.29
Pennant Oil Co.			
NE 17-27-12	384.12	2	6.40
Penn-Osage Ohio Osage Oil Cos.			
NW 10-21- 9	1,965.23	4	21.38
SW 3-24-11	195.59	2	3.25
SE 32-26-11	161.24	1	5.37
Phillips Pet. Co.			
NW 5-27- 8	571.60	2	9.52
NE 27-29- 9	1,049.58	1	34.98
NE 9-24-10	602.55	3	6.69
SW 15-26-11	296.48	3	3.29
Phillips Pet. Co. & Standish Oil Co.			
NE 16-29- 9	1,704.38	15	3.79
NW 16-29- 9	340.90	3	3.78



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NOVO RELIABLE POWER

Gross Production of Osage Reservation for September (Continued)

Lease	Gross Producton	No. Wells	Per Well Per Day Average
Phillips & Delmer Oil Co.			
SE 35-25- 9	5,018.08	5	3.34
NE 35-25- 9	None	.....	.....
NE 16-28-10	171.72	1	5.72
NW 16-28-10	165.82	1	5.52
SE 16-28-10	139.10	1	4.63
Plover Drilling Co.			
SW 12-27-10	136.60	.....	.....
NW 13-27-10	255.86	.....	.....
NE 19-25-11	207.08	.....	.....
Plymouth Pet. Co.			
SW 25-25-11	7,093.94	10	23.64
SE 26-25-11	3,357.76	2	55.96
NE 26-29-11	13,298.33	4	110.81
Potter Oil Co. & Norwood Oil			
NW 16-24-8	379.92	1	12.66
Potomac Oil Co.			
NW 24-23-11	91.52	.....	.....
Potomac Oil Co. & Camatop Oil			
W½SW20-23-11	702.37	.....	.....
Prairie Oil & Gas Co.			
NE 11-21- 8	1,906.14	17	3.72
SE 12-21- 8	2,886.16	.....	.....
SW 12-21- 8	4,344.54	11	13.16
NW 25-22-10	767.52	5	5.11
NE 11-23-11	1,047.32	8	4.36
NW 12-23-11	261.83	2	4.36
SE 23-23-11	1,132.98	9	4.19
NE 24-23-11	727.91	6	4.04
NW 29-23-11	176.12	7	.83
SE 31-23-11	388.50	15	.86
SE 25-24-11	1,140.43	18	2.11
SW 25-24-11	952.18	14	2.26
SE 26-24-11	322.75	7	1.54
SW 27-24-11	887.36	5	5.92
SW 29-24-11	689.88	2	11.48
NE 35-24-11	490.12	6	2.72
NW 36-24-11	542.64	5	18.09
NE 36-24-11	None	.....	.....
NW 22-25-11	346.30	2	11.54
SW 30-25-11	2,766.14	22	4.19
SW 15-29-11	69.48	9	.26
NE 19-23-12	10,339.02	19	18.14
NW 19-23-12	623.26	14	1.43
NW 20-23-12	1,318.36	7	6.28
NW 27-24-12	1,259.45	19	2.74
NW 29-24-12	294.30	8	1.22
NE 30-24-12	177.74	15	.39
NW 30-24-12	1,421.88	15	3.16
Prairie Oil & Gas Co. & Shulthis			
NW 17-29- 9	593.17	4	4.94
NE 18-29- 9	148.29	1	4.94
SW 17-29- 9	497.52	1	16.58
P O & G & Elmer Oil Co.			
SE 17-21-10	2,864.88	8	11.94
NE 17-21-10	762.60	4	6.37
NW 26-24-10	337.42	3	3.75
NE 26-24-10	337.42	3	3.75
SE 5-22-12	180.80	3	2.00
Prairie Oil & Gas Co. & Continental Refining Co.			
SW 29-24- 9	674.08	1	22.47
Porter, B. P.			
SE 28-26-11	642.64	2	10.71
SW 28-26-11	321.32	1	10.71
Producers & Refiners Oil Corp.			
SE 8-22-11	206.45	1	6.88
R & M Oil & Gas Co.			
NE 33-24-11	581.84	4	19.39
Ramsey Oil Co.			
NE 16-29-11	45.40	5	.30
NW 29-29-11	None	.....	.....
NE 30-29-11	359.10	.....	.....
Redbank Oil Co.			
SW 33-23-11	2,897.23	9	10.72
Roxana Pet. Co.			
NW 3-28-10	206.42	7	.98
NE 10-28-10	63.30	1	2.11
SW 10-28-10	253.21	4	2.11
NE 11-28-10	53.47	1	1.78
NW 11-28-10	53.47	1	1.78
SW 11-28-10	53.47	1	1.78
SE 23-29-10	108.00	2	1.80
NE 28-29-10	216.00	4	1.80
NW 23-29-10	54.00	1	1.80
SE 34-29-10	138.55	4	1.15
NE 34-29-10	415.67	12	1.15
Sagamore Oil & Gas Co.			
NW 34-24-12	428.06	7	2.04
Sagamore Oil & Gas Co. & Wolverine			
SW 27-24-12	1,032.76	14	2.46
SW 28-24-12	197.32	3	2.19
SW 29-24-12	592.61	5	3.95
SW 30-24-12	759.56	15	1.69
SE 30-24-12	759.56	15	1.69
Sheppard Oil Corp.			
NE 28-25-11	401.91	.....	.....
Savoy Oil Co.			
SW 22-20-12	213.68	7	1.08
SW 24-22-10	72.00	1	2.40
Stekoll & Appleman			
SE 5-25-12	341.70	.....	.....
Santuna Oil Co.			
NE 4-28-10	188.88	3	2.10
Silurian Oil Co.			
SE 12-23-11	58.44	1	1.95
SE 17-23-12	38.40	6	.21
NW 17-23-12	7,165.37	18	13.27
NE 17-23-12	5,849.28	10	19.50
NW 18-23-12	146.23	3	1.62
NE 18-23-12	1,462.32	10	4.87
Skelly Oil Co. et al			
SW 21-21-12	2,296.34	1	76.54
Skelton-Moore Oil Co.			
SE 32-26-12	495.12	4	4.13
SE 33-26-12	168.04	5	1.12
SW 33-26-12	495.12	4	4.13
NW 34-26-12	330.08	3	3.66
SW 34-26-12	990.24	7	4.71
Standish Oil Co.			
SE 35-24-11	614.82	9	2.28
SE 36-24-11	132.94	7	.63
SW 36-24-11	1,278.24	9	4.93
Stering Oil & Gas Co.			
SE 36-27-10	369.01	.....	.....
Steyner Oil Co.			
SW 24-25- 9	239.16	.....	.....
NW 13-23-11	340.80	.....	.....
NW 14-23-11	5,473.08	.....	.....
NE 28-24-11	353.71	.....	.....
NW 28-24-11	1,469.83	.....	.....
NE 29-24-11	719.80	.....	.....
NW 29-24-11	372.08	.....	.....
SW 9-25-11	.....	.....	.....
SE 16-25-11	1,497.00	.....	.....
SW 16-25-11	3,395.35	.....	.....
SE 17-25-11	186.18	.....	.....
SW 17-25-11	91.22	.....	.....
SESW 4-26-11	125.78	.....	.....
SE 5-26-11	.....	.....	.....
NE 27-22-12	70.53	.....	.....
Summit Oil Co.			
NE 20-26-11	2,938.38	.....	.....
Texas Company			
NE 36-26- 9	166.12	1	5.54
Texas-Oklahoma Investment Co.			
SE 4-21-12	419.16	.....	.....
Tighe, J. P.			
NW 17-26-11	635.86	4	5.30
NE 17-26-11	64.88	1	2.16
Two Rivers Oil & Gas Co.			
SW 17-26-11	71.92	.....	.....
T. M. G. Oil Co.			
NE 7-23-12	310.65	.....	.....
Tuloma Oil Co. & Mid-Co.			
SW 25-27-11	152.84	2	2.55
Uncle Sam Oil Co.			
SW 22-22- 9	181.03	.....	.....
United Okla. Oil & Gas Corp. & Evidence Oil Co.			
NE 8-22-12	127.59	4	1.08
NW 8-22-12	471.08	6	2.62
Wahpshah-she Oil Co.			
NW 15-29- 9	331.91	4	2.76
SW 15-29- 9	165.48	4	1.38
NE 15-29- 9	1,739.98	7	8.29
Wood, Kinney & McIntyre			
SE 29-23-11	400.01	2	6.66
West & Hazlett			
NW 16-20-12	961.32	.....	.....
NW 22-20-12	419.16	.....	.....
Western American Oil & Gas Co.			
NE 27-29- 9	1,040.26	.....	.....
William M. Graham Oil & Gas Co.			
SE 25-23- 8	362.54	.....	.....
SW 6-24-10	389.59	.....	.....
NE 6-24-10	4,188.04	.....	.....
SW 2-27-10	753.00	.....	.....
Wigwam Oil Co.			
SE 14-24-11	2,961.26	8	12.33
NW 23-24-11	127.40	1	4.24
NE 23-24-11	1,401.37	11	4.25
NE 24-24-11	1,065.10	17	2.08
NW 24-24-11	877.14	14	2.09
Wrightsman Oil Co., Pine Investment Co.			
NE 30-26-10	594.36	2	9.91
Warren Pet. Co.			
NW 23-22-10	253.36	1	8.45
SW 28-24-10	323.66	2	5.94
SW 16-26-11	84.08	3	.93
SW 36-27-11	None	.....	.....
Winona Oil Co.			
NE 25-24- 9	3,398.24	6	13.32
SE 25-24- 9	3,318.18	14	7.90
NE 36-24- 9	1,595.48	5	10.64
NW 36-24- 9	None	.....	.....
NE 20-29- 9	769.17	3	8.55
SE 27-22-10	2,066.26	6	11.47
SE 23-22-10	122.23	1	4.07
NE 34-27-10	146.66	1	4.89
S½NW 35-27-10	131.48	1	4.38
NW 5-22-11	191.04	5	1.27
NE 23-23-11	249.82	3	2.77
SE 29-24-11	1,306.83	6	7.26
NW 16-29-11	62.22	2	1.04
NW 22-29-11	242.50	7	1.15
NE 9-20-12	4,708.63	16	9.81
SW 9-20-12	2,693.50	10	8.97
SE 17-20-12	1,944.37	8	8.10
Wiser Oil Co.			
NE 6-22-11	187.64	8	.78
SE 7-26-12	183.10	2	3.05
SW 10-26-12	71.74	6	.40
NW 15-27-12	27.00	1	.90
SW 15-27-12	192.85	14	.46
SE 18-27-12	None	.....	.....
NE 21-27-12	152.46	8	.64
SW 21-27-12	1,075.08	17	2.11
SE 21-27-12	711.40	19	1.24
NW 22-27-12	133.91	11	.41
SW 22-27-12	None	.....	.....
NW 28-27-12	795.86	13	2.04
Whittier & Echo Oil Co.			
NE 22-27-10	173.58	2	2.89
Wolverine Oil Co.			
NW 1-23-11	793.53	9	2.94
NE 2-23-11	264.51	3	2.94
SE 13-24-11	1,140.94	10	3.80
SW 13-24-11	613.38	4	5.11
NW 13-24-11	314.74	4	2.62
SW 13-24-11	78.68	1	2.62
SW 15-24-11	None	.....	.....
NW 15-24-11	384.48	9	1.42
SW 22-24-11	167.00	2	2.78
SE 23-24-11	249.73	8	1.04
SE 24-24-11	468.24	15	3.04
SW 24-24-11	437.02	14	1.04
NE 5-23-12	1,105.14	16	2.30
NW 5-23-12	414.42	6	2.30
NW 6-23-12	468.88	6	2.60
NE 6-23-12	568.10	18	1.05
E½SW 7-23-12	196.20	5	1.30
SE 7-23-12	709.31	7	4.33
SW 8-23-12	1,823.97	18	3.38
SE 8-23-12	3,502.26	8	14.55
NW 19-24-12	1,032.49	11	3.13
NE 19-24-12	469.30	5	3.13
SE 19-24-12	1,338.33	14	3.19
SW 19-24-12	1,535.54	10	5.12
NW 20-24-12	69.42	1	2.31
SW 20-24-12	500.24	12	1.39
SW 21-24-12	41.69	1	1.39
NE 22-24-12	1,104.00	10	3.68
NW 22-24-12	1,214.45	11	3.68
SE 22-24-12	717.53	6	3.99
SW 22-24-12	1,435.06	12	3.99
Workman Oil & Gas Co			
NW 16-26-11	434.82	.....	.....
Yorkhoma Oil & Gas Co.			
NW 20-26-11	1,390.08	.....	.....
Zola Oil Co.			
SE 5-25-12	147.40	2	2.46
NW 8-25-12	73.68	1	2.68
NE 8-25-12	221.04	3	2.46
NW 9-25-12	73.68	1	2.68
SW 15-25-12	1,146.18	23	1.66
SE 16-25-12	597.84	12	1.66
NE 21-25-12	1,267.20	14	3.02
NW 22-25-12	1,717.32	21	2.76
Verland Oil & Gas Co.			
SE 31-27-10	370.31	2	6.17
SW 31-27-10	183.96	.....	.....
Barnsdall Oil Co.			
SE 16-24-11	2,842.92	25	3.79
Barsndall, Echo-Devonian & A. W. Leonard Drilling Co.			
NW 36-25-11	3,028.54	4	25.24
NE 36-25-11	153.47	2	2.57
Barnsdall Oil Co. & Larkin			
SW 23-24-10	244.90	.....	.....
NE 23-24-10	551.33	5	3.68
Barnsdall & Neenah Oil Co.			
SW 1-24-10	170.42	5	1.14
SE 11-24-10	488.48	4	4.07
NE 11-24-10	669.78	5	4.47
Barsndall & Osage Dev. Co.			
NE 20-24-11	281.06	1	9.37
NE 21-24-11	901.18	11	2.73
NW 21-24-11	325.98	3	3.62
Barnsdall Oil Co. & Sonne			
SW 2-24-11	58.08	1	1.94
NW 10-24-11	263.90	2	4.40
Bigheart Prod. & Ref. Co.			
SW 10-24-10	1,355.27	6	7.53
NE 12-24-10	48.35	2	.81
SW 12-24-10	685.20	8	2.85
NW 12-24-10	982.50	17	1.93
NE 14-24-10	86.56	2	1.44
SE 14-14-10	659.67	9	2.44
NW 22-24-10	154.00	6	.85
NE 22-24-10	144.26	4	1.20
NW 24-24-10	225.14	3	2.61
Crescent Oil Co.			
SW 13-24-10	270.72	.....	.....
Echo Oil Co. & Devonian			
N½ 29-25-10	154.56	4	1.29
SE 29-25-10	478.40	2	7.97
Barnsdall Oil & Sonne			
SE 3-24-11	531.74	2	8.86
Barnsdall Oil, Sonne-Echo-Devonian & Leonard Drilling Co.			
NW 3-24-11	.....	.....	.....
NE 3-24-11	4,010.56	2	68.36
Foster & Foster & Davis			
NW 15-24-10	190.72	2	3.18
NE 15-24-10	373.82	2	6.23
SE 15-24-10	407.35	2	6.79
SW 15-24-10	172.76	1	5.76
Fifty-Nine Osage & Foster			
SE 7-24-11	6,681.24	.....	.....
SW 7-24-11			
SW 8-24-11	4,506.65	.....	.....
SE 8-24-11			
SE 9-24-11	1,789.14	.....	.....
SE 10-24-11			
SW 10-24-11	382.08	.....	.....
SW 11-24-11	557.78	.....	.....
Gilliland Oil Co.			
SE 36-24-10	138.37	6	.77
SW 31-24-11	1,008.07	20	1.68
NW 31-24-11	404.00	2	6.74

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Lease	Gross Production	No. Wells	Per Well Per Day Average
Ind. Terr. Ill. Oil Co.			
NE 16-24-11	1,855.50	16	3.87
NE 17-24-11	158.50	2	2.64
NW 17-24-11	630.92	2	10.52
NW 18-24-11	649.54	8	2.70
Laurel Oil & Gas Co.			
NE 30-24-11	3,506.48	10	11.68
Laurel Oil & Gas Co., & Chandler			
SE 18-24-11	388.20	2	6.47
Lewis Oil Company			
SE 9-24-10	5,862.43	13	15.03
NW 8-24-11	233.16	2	3.89
Magna Oil & Ref. Co.			
SE 17-24-11	1,272.08	11	3.85
SW 17-24-11	184.80	5	1.23
Nicaragua Oil Co.			
S½SE 11-24-10	889.76	.....	.....
New England Oil & Pipe Line Co.			
SE 5-24-10	11,078.69	19	19.43
Plover Drilling Co.			
SW 4-24-10	3,756.90	.....	.....
Texhoma Pet. Co.			
NE 16-24-10	2,592.38	9	9.60
To Bigheart Prod. & Ref. Co.			
Whittier & Echo Oil Co.			
NW 6-24-10	3,662.90	9	13.56
Carter Oil Co.			
NW 15-23- 8	None	.....	....
NE 36-23- 8	166.92	1	5.56
NE 15-24- 8	392.12	1	13.07
NW 26-24- 8	4,115.07	12	11.43
SW 26-24- 8	1,603.18	5	10.68
SE 35-24- 8	None	.....	.....
SE 13-24- 9	12,787.49	15	28.41
SE 28-25- 9	2,439.55	5	16.26
NE 28-25- 9	1,110.61	1	37.02
NE 32-25- 9	1 446.98	4	12.06
NW 9-26- 9	2,533.14	1	84.43
SW 13-21-10	172.88	2	2.88
SE 17-22-10	567.20	1	18.90
NW 9-25-11	198.10	2	3.30
SE 8-23-11	7,289.90	8	30.87
NE 4-21-12	742.03	4	6.18
NW 4-22-12	371.84	1	12.39
SE 33-22-12	941.23	4	7.84
Carter Oil Co. & Graham			
SE 6-24-10	7,142.86	21	11.33
Carter Oil Co. & Southwestern			
SW 28-23-11	597.30	6	3.31
SW 33-21-12	4,269.04	20	7.11
Celestine Oil Co.			
NE 33-25- 9	5,225.24	8	21.77
Cosden Oil & Gas Co.			
SE 36-23- 8	1,252.42	1	41.74
SE 23-25- 9	217.32	1	7.24
SE 29-22-10	1,116.60	6	6.48
Gilmond Oil Corp.			
SE 33-25- 9	1,389.52	4	11.57
Gilliland Oil Co.			
SE 23-23- 7	171.92	.....	.....
NE 23-27- 7	466.44	1	15.54
SW 23-27- 7	4,108.16	3	45.64
NW 23-27- 7	3,625.14	1	120.83
SE 26-23- 7	43,831.20	7	208.72
NE 36-23- 7	3,999.56	3	44.40
NE 24-25- 8	3,194.78	4	26.53
Gypsy Oil Co.			
NE 35-23- 7	17,165.38	4	143.04
Haverhill Pet. Co.			
N E 27-24- 8	499.80	.....	.....
Dresser Oil Co.			
SW 3-24- 9	245.00	1	8.16
SW 34-25- 9	5,677.61	10	18.92
SE 12-23-10	5,242.54	13	13.44
NE 13-23-10	6,874.59	12	19.09
Oklahoma Prod. & Ref. Corp.			
Sections 5, 6, 8, 9, 10, 16 and 18-23-8	26,172.15	131	6.65
Peters Oil Corp.			
N½NE, E½NE NW 30-23- 8	9,597.52	16	20.00
I. D. Simons, et al			
SE 23-25- 8	378.96	.....	.....
C. I. Stralem			
NW 13-24- 9	3,256.54	6	18.09
Warren Pet. & Evidence Oil			
NW 3-24- 9	11,551.30	13	29.61
Wrightsman Oil Co.			
SE 19-23- 9	10,394.20	12	28.87
Finance Oil & Leahy Co.			
SW 19-23- 9	11,878.85	.....	.....
Peters-Wrightsman Oil Co.			
SW 13-23- 8	7,422.00	1	247.40
Gypsy Oil Co.			
SE 1-21- 7	5,655.00	14	13.46
NE 1-21- 7	5,535.18	32	5.55
SE 32-24- 8	171.95	2	2.86
SE 24-25- 9	108.64	1	3.62
SW 5-24-10	372.36	6	2.06
NW 31-24-12	360.74	17	.70
NE 31-24-12	3,029.90	9	10.11
NW 32-24-12	1,303.70	4	10.86
SW 30-25-10	121.04	2	2.01
Gypsy Oil Co. & McMan O. & G.			
SE 26-24- 8	1,607.38	7	7.65
SE 21-28- 7	149.44	1	4.98
Gypsy, Phillips, McGraw & McMan			
SW 17-27- 8	5,397.11	5	35.98
SE 18-27- 8	6,077.51	6	33.76
NE 19-27- 8	162.60	3	1.80
Gypsy Phillips, McGraw & McMan et al			
NW 25-24- 9	5,389.00	19	9.45
Gypsy Oil & Harwell			
NE 8-24-10	8,794.85	18	16.28

Lease	Gross Production	No. Wells	Per Well Per Day Average
Hector Oil & Alworth			
SE 7-27- 8	379.72	.....	.....
Midland Securities Co.			
NE 26-24- 8	2,203.60	6	12.24
Minnehoma Oil Co.			
SW 11-26- 8	202.60	.....	.....
NW 14-26- 8	395.84	.....	.....
Mountain State Oil Co.			
SW 15-24-12	936.66	10	31.33
SE 15-24-12	381.80	5	2.55
SW 18-24-12	62.71	2	1.04
SW 31-24-12	884.00	16	1.84
SE 31-24-12	1,067.89	15	2.37
SW 32-24-12	542.13	11	1.64
SE 32-24-12	220.33	5	1.46
SE 33-24-12	190.00	3	2.11
SW 34-24-12	126.00	3	1.40
SE 21-25-12	1,179.97	15	2.62
SW 22-25-12	542.52	10	18.08
NE 28-25-12	585.44	3	6.50
NW 28-25-12	137.78	1	4.59
Steyner Oil Co.			
SE 19-23-12 SW 19-23-12	544.02	.....	.....
Skelly Oil Co.			
SW 16-24- 8	883.79	1	29.45
SE 23-24- 8	3,951.76	2	65.86
Texas Company			
SW 25-24- 8	305.00	4	2.50
Tuloma Mid-Co. & D. R. Travis			
NE 15-26- 8	711.04	.....	.....
Sand Springs Home et al			
SE 23-20-11	2,421.69	9	8.96
SW 24-20-11	266.36	2	4.43
NE 26-20-11	2,501.24	4	20.84
SE 28-20-11	217.76	1	7.25
SE 31-20-11	194.43	1	6.48
SW 32-20-11	449.76	1	14.99
Ken-Osage Oil Co.			
NE 23-20-11	93.84	2	1.56
Dunn Pet. Co.			
NW 18-22- 9	385.18	1	12.83
Gilliland Oil Co.			
SE 26-23- 7	9,059.50	7	43.14
Marland Refining Co.			
NE 36-27- 5	13,073.89	1	435.79
Marland, & Kay County Gas			
NW 11-25- 3	196.80	1	6.56
SE 34-22-10	5,003.82	14	11.86
Marland, Kay Co. Kenney-Cleary & Tom James Oil Co.			
SE 19-22-10	894.16	1	29.80
NE 13-22- 8	6,431.58	9	23.82
Marland— K Co. K-Cleary, T. James Oil Co., & Francoma Oil Co.			
NW 34-25- 8	191.28	1	6.37
NE 3-24- 9	1,548.18	5	10.10
SE 24-24- 9	4,415.17	13	11.32
NE 26-24- 9	2,440.30	11	7.37
NW 34-25- 9	5,492.35	1	183.07
NE 35-24- 9	372.24	1	12.40
SE 4-22-10	1,150.05	1	38.33
Marland Okla. Prod. & Ref. Co.			
SE 10-25- 8	520.05	.....	.....
Twin States Oil Co.			
SW 18-24-10	9,481.66	12	26.34
Minnehoma Oil Co.			
⅝W 15-24- 9	1,228.08	.....	.....
Avery, C. S., et al			
SW 19-25- 9	5,295.58	5	35.30
Dunn Pet. Co.			
SW 9-24-10	None	.....	.....
Warren Pet. & Evidence Oil			
NE 23-23-10	2,294.97	7	10.92
SE 23-23-10	333.42	1	11.11
Foster & Davis			
NE 17-25- 9	557.59	1	18.58
NW 17-25- 9	371.44	1	12.38
Flesher Pet. Co.			
NW 9-24-10	1,913.24	8	7.97
Foster, Winona & Potter			
NW 24-24- 9	5,997.44	12	16.66
Leo Kaufman			
NW 19-25- 9	330.70	.....	.....
Humphreys Pet. Co.			
SW 16-23-11	544.12	5	3.62
Kewanee Oil & Gas Co.			
NW 13-23-10	1,102.98	6	6.12
Lawrence Gas Co.			
SE 3-27-10	309.88	.....	.....
Landon & Foster & Davis			
SE 17-25- 9	1,896.81	3	21.07
Mid-Co. Pet.t& Tuloma			
NE 10-27-10	935.57	5	6.23
SE 10-27-10	46.46	1	1.54
Dresser Oil Co.			
NE 18-23-11	336.96	2	5.61
O. P. & Refining Co.			
SE 11-27-10	839.48	8	3.49
SW 11-27-10	318.46	6	1.77
NE 11-27-10	3,161.99	1	15.39
NW 11-27-10	9,339.42	13	23.94
NE 14-27-10	1,880.12	22	2.84
NW 14-27-10	2,106.80	24	2.93
SE 14-27-10	170.10	2	2.83
SW 14-27-10	739.26	9	2.73
Penn Oil Corp.			
SW 30-25-10	1,032.20	2	17.20
Phillips Pet. Co.			
NW 7-24-10	948.53	6	5.27
NE 7-24-10	3,319.83	21	5.26
SW 17-29- 6	1,904.24	1	63.47
NE 17-29- 6	3,939.51	1	131.31

Lease	Gross Production	No. Wells	Per Well Per Day Average
Standish Oil Co.			
SE 7-24-10.....	564.20	3	6.26
Skelly Oil Co.			
SW 24-24- 9.....	10,430.50	23	15.11
Testlog Oil Co.			
NW 19-24-10.....	6,549.46	.....	.....
NE 14-24- 9.....	5,456.64	.....	.....
Tuloma Oil Co.			
SW 27-25- 9.....	6,814.09	4	56.78
Almeda Oil Co.			
SW 19-26-12.....	723.32	9	2.68
SE 20-26-12.....	365.62	3	4.06
SW 21-26-12.....	274.22	3	3.05
SW 22-26-12.....	72.72	4	.60
NW 28-26-12.....	157.54	2	2.62
NE 29-26-12.....	91.40	1	3.04
NW 30-26-12.....	180.44	6	1.00
NE 30-26-12.....	60.00	1	2.06
Burkett & Phillips Pet.			
E½SE 2-25-11...	1,885.64	7	8.98
Standish Oil Co.			
W½SE 2-25-11...	1,539.76	5	10.26
Dana Oil Co.			
N½NW 4-25-12..	276.31	.....	.....
Davenport Pet. Co.			
W½SW 2-25-11..	181.68	3	2.01
45 Oil Co. & E. S. Bell			
NW 4-25-12.....	500.00	9	1.85
NE 5-25-12.....	1,018.46	6	5.65
Interstate Oil & Gas Co.			
SE 16-26-12.....	75.25	8	.31
SW 16-26-12.....	65.48	4	.54
E½SW 18-26-12..	194.57	8	.78
W½SW 18-26-12.	558.96	8	2.33
Larkin & Reynold			
SW 33-26-12.....	157.67	6	.88
SE 33-26-12.....	377.72	5	2.52
SE 28-26-12.....	2,085.55	13	5.34
Mid-Co. Pet. & Tuloma Oil			
SE 10-27-10.....	None	.....	.....
SW 21-27-11.....	186.82	.....	.....
Ohio Cities Gas Co.			
SE 34-27-10.....	932.61	14	2.22
Panther Oil & Dev. Co.			
SW 30-26-12.....	55.74	2	.92
Phillips Pet. Co.			
SW 1-25-11.....	80.16	1	2.67
SE 11-25-11.....	1,282.53	16	2.67
NE 11-25-11.....	961.90	12	2.67
SW 12-25-11.....	1,122.22	14	2.67
NW 12-25-11.....	80.16	1	2.67
SE 1-26-11.....	167.44	13	.43
SE 13-26-11.....	241.92	4	2.01
Standish Oil Co.			
SW 15-25-11.....	1,134.55	11	3.44
Skelly Oil & Phillips Pet.			
NE 23-25-11.....	6,039.60	5	40.26
J. P. Tighe			
FSE 33-26-12....	284.70	11	.86
Warren Pet. Co.			
SE 35-27-11.....	977.43	8	4.07
SW 36-27-11.....	None	.....	.....
SW 17-27-11.....	None	.....	.....
Barnsdall Oil Co.			
NW 5-24-10.....	9,571.20	23	13.87
NE 5-24-10.....	602.88	4	5.02
Barnsdall Oil Co. & Osage Dev.			
NW 31-25-10.....	8,182.75	5	54.55
NE 31-25-10.....	161.58	1	5.39
SE 31-25-10.....	1,548.96	5	10.33
SW 32-25-10.....	163.26	3	1.81
NE 32-25-10.....	None	.....	.....
Braden & Moore			
N½ 12-21-S.....	22,205.75	.....	.....
Minnehoma Oil Co.			
N½NE 13-21-8...	2,776.51	.....	.....
Pochequette & Devonian			
NE 1-24- 9.....	6,251.18	15	13.89
NW 1-24- 9.....	2,454.26	7	11.69
Tidal Oil Co., Breene & Kraaer Oil Co.			
860 Acres			
SE 13-21- 8.....	706.58	10	2.36
Amerada Oil Co.			
SE 16-22- 9.....	4,295.18	2	71.59
Alexander, J. H. et al			
NE 33-22-10.....	22,339.44	37	20.13
Alexander-Shakely Pet. Co., et al			
SW 13-25-11.....	11,638.28	6	64.66
Acacia Oil & Gas Co.			
SE 22-22-10.....	171.84	.....	.....
Clover Oil Co.			
SE 21-29-11.....	442.36	2	7.37
SW 22-29-11.....	151.24	2	2.52
SW 31-22-12.....	1,480.01	3	16.47
NW 6-21-12.....	26,562.33	14	63.24
Deep Pool Oil Company			
NW 31-21-12.....	930.86	5	6.21
Deep Pool Oil Company & Stewart			
NW 30-21-12.....	269.28	3	2.99
Flesher Oil Company			
SE 1-21-11.....	5,002.54	16	10.42
SW 1-21-11.....	488.95	2	8.15
NW 12-21-11.....	12,193.81	6	67.74
Gardner-Spencer & Burke			
NE 34-21-10.....	374.92	3	4.17
NW 34-21-10.....	None	.....	.....
Guffey-Gillespie Oil Co.			
SE 22-24- 8.....	1,986.76	7	9.46
SW 23-24- 8.....	3,997.68	4	33.32
NE 24-24- 9.....	6,253.68	8	26.06
SE 26-24- 9.....	925.84	5	6.17
NW 5-21-10.....	394.50	1	13.15
SW 27-22-10.....	4,156.32	8	17.32
NE 32-22-10.....	5,447.80	16	11.35
SW 32-22-10.....	2,208.44	4	18.40

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THOR pneumatic hammers have no couplings, clamps, keys and locknuts to give trouble.

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Gas Oils	Car Oil	Cup Greases
Spindle Oils	Fuel Oils	Gear Greases
Motor Oils	Diesel Fuels	Axle Grease
Engine Oils	Bunker Oils	Solid Lubricants
Machine Oils	Cylinder Oils	Petroleum Coke
Dynamo Oils	Cylinder Stocks	Metal Polishes
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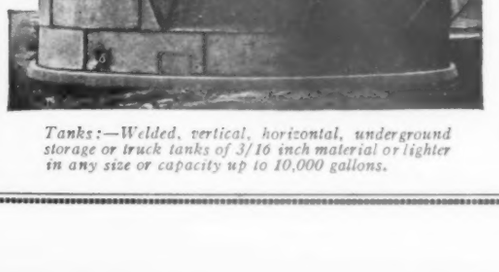

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C. C. FOUTS CO.
Middletown, Ohio

Lease	Gross Production	No. Wells	Per Well Per Day Average
NW 33-22-10.....	6,015.67	18	11.14
SW 34-22-10.....	10,574.39	12	29.37
NW 34-22-10.....	18,374.93	19	32.24
SE 18-24-10.....	783.72	3	8.71
SW 13-25-10.....	89.08	3	.99
Harwell & Pulaski			
NW 6-23-11.....	405.26	2	6.75
Howard Duffield & Berlin			
SW 30-20-12.....	2,257.88	.....	.....
NW 15-21-12.....	323.84	.....	.....
Ideal Royalty Co.			
SW 20-21-12.....	1,075.93	11	32.66
Inland Oil Co., Titus & Griffin Producing Co.			
SW 34-22-12.....	2,240.49	12	6.22
Jennings, R. G. & Lawrence Gas Co.			
NW 36-29-11.....	2,681.68	.....	.....
Kewanee Oil & Gas Co.			
NE 4-21-10.....	1,706.16	11	5.17
Margay Oil Co.			
NE 21-22- 9.....	1,832.28	.....	.....
NW 35-22-10.....	3,402.88	.....	.....
Marland Refg. Co. et al			
NW 28-25-10.....	197.80	1	6.59
SW 3-21-10.....	372.24	1	12.41
NE 16-21-10.....	198.53	2	3.30
Lewis Oil Company			
SW 6-21-12.....	6,470.28	13	16.59
SE 36-22-11.....	155.44	2	2.59
Mid-Co. Pet. Co.			
SE 18-22-10.....	1,081.76	3	12.02
Midland Oil Co.			
SE 28-22-10.....	8,409.24	9	31.15
SW 28-22-10.....	2,761.56	13	7.08
McKinney, John E. & Frank M. McKinney			
NW 14-29- 9.....	6,700.22	11	20.30
SW 14-29- 9.....	2,245.90	7	10.64
Natural Res. Dev. Co. (Dresser)			
NW 17-23-11.....	1,004.27	2	16.74
O. P. & Refg. Corp.			
NE 19-22-10.....	11,162.52	7	53.15
Page, W. R.			
SE 29-25-11.....	597.10	6	3.32
Penn. Okla. Pet. Co.			
NE 14-25-10.....	164.68	.....	.....
Pioneer Pet. Co.			
SW 5-20-11.....	1,545.98	.....	.....
Potomac Oil Co. & Andes Oil			
NW 34-22-12.....	139.42	.....	.....
Redbank Oil Co.			
NE 13-25-10.....	392.84	4	3.27
Rex Oil Co. & Pyramid Oil Co.			
NE 34-22-10.....	12,872.28	30	14.30
Sandford Oil Co.			
SE 14-25-11.....	7,677.66	14	18.28
Sinclair Oil & Gas Co.			
NE 24-21- 8.....	1,000.40	.....	.....
NE 5-21-10.....	7,505.12	22	11.37
SE 32-22-10.....	3,698.94	14	8.81
SE 24-23-11.....	1,068.46	11	32.38
NW 31-25-11.....	1,090.00	9	4.04
SE 8-20-12.....	209.17	2	3.49
SW 10-21-12.....	402.12	8	1.68
Sections 4 to 18-23- 8.....	38,008.81	130	9.75
SW 4-21-10.....	763.96	4	6.37
Skelly Oil Company			
SE 13-25-10.....	1,536.61	3	17.07
Skelly, Farrel, Norris & Titus			
SW 8-23-11.....	6,170.04	14	14.12
Spring Oil Company			
SE 28-25-11.....	659.60	2	10.99
SW 27-25-11.....	60.00	1	2.00
Texas Company			
SE 9-20-12.....	709.90	7	3.38
SW 10-20-12.....	493.00	4	4.11
NW 33-21-12.....	2,280.32	15	5.06
Titus, Norris & Bird			
NW 10-20-12.....	6,637.37	18	12.29
Twin State Oil Company			
NW 32-22-10.....	3,797.40	6	21.10
Winona Oil Co.			
SE 16-23- 8.....	329.28	1	109.76
Winona Oil Co. & Markham			
SW 33-22-10.....	2,485.84	14	59.19
Winemiller et al			
NE 23-25-10.....	118.52	.....	.....
Standish Oil Co.			
SE 26-29-11.....	3,003.74	4	25.03
Dresser Oil Co.			
SW 21-23-11.....	203.57	1	6.79
Foster & Davis			
NE 13-21- 8.....	424.32	4	3.54
NW 13-21- 8.....	685.70	2	11.43
Large Oil Co.			
NW 29-21- 9.....	1,954.89	.....	.....
Price Oil Co.			
NE 36-24- 8.....	1,631.88	11	4.95
Santuna Oil Co.			
NE 35-24- 8.....	163.20	4	1.38
Sperata Oil Co. & Foster & Davis			
F.SE 13-21-8.....	554.10	5	3.69
F.SW 13-21-8.....	218.90	2	3.65
Mason & Overlees			
SE 23-21- 8.....	6,016.73	6	33.43
Grand total production of reservation for month.....			1,774,444.89
Grand total number of wells.....			5,781
Average daily production for month, barrels.....			59,148
Per well average— barrels.....			10

Not All Types Of Trailers Are Good For Petroleum Distribution

By F. A. Bean

THE use of trailers in the transportation of petroleum products is one which is extremely hard to discuss briefly because of the great number of factors entering into it. Some very good transportation engineers are very much opposed to the use of trailers while others equally good express themselves as highly in favor of it. There is little question but that under certain conditions a system of trailers can be established in such a manner as to show an earning.

The use of trailers in handling any commodity is largely dependent upon the grades of the routes over which they operate. Managers should give this question the closest attention. As a general rule it is not wise to attempt to operate trailers on grades of over four per cent as it will reduce the amount that can be hauled on the trailer. The construction of the roads, the length of route, the customer's unloading facilities and the type of trucks to be used all have an important bearing on the success of this plan of operation. In considering this subject we are assuming that grades are low and that other conditions are good for the operation of a trailer system.

When a customer's unloading pipes are so located that it is necessary for trucks to back into position, it will be found in a great many cases that a trailer is a real hardship and that time lost in manuevering into position for three or four customers will be almost equal to an additional trip. It must be added that improvement of design in steering mechanism and hitch are rapidly overcoming a great deal of this difficulty.

The specifications for the chassis of a trailer should be very carefully considered. The principles which apply to the truck chassis and its tank should also apply to the trailer and its tank. It should be just as well constructed and be subjected to the same rigid inspection system. Very briefly the specifications should be as follows:

If of the semi-trailer type it should have leg or other supports when unhitched. The hitch should be of such design that sharp corners can be turned and it can be backed accurately. This will mean that it should be equipped with steering knuckle axles. It should be reversible, that is, be equipped at both ends with a steeering knuckle axle and coupling devices. It should track perfectly with the towing vehicle and have no side sway. The hitching devices should be so designed that it can be coupled and uncoupled quickly and without danger to the operator.

It should have tires of the proper size to carry the total load of the chassis, body and pay load. All moving parts should be bushed. The proper kind of bearings should be provided at all points requiring them. Proper lubrication should be provided at all points. The frame and springs should be the same general design and strength as would be required in a truck of the same capacity.

It should be remembered that a truck can be overloaded just as easily by causing it to pull too great a load as it can by putting too much load on its own chasssis. A motor truck when loaded can pull a greater trailer load than when unloaded. This is because of the greater tractive power given to the rear wheels of the truck and not because of any added power derived from the motor. Engineers are divided in opinion as to whether in a regularly established trailer service an ordinary truck with a tank load or a tractor unit should be used for motive power.

There are four types of trailers in use. The first is the small two wheel trailer, having a carrying capacity of about 500 pounds. The load is about equally distributed on either side of the wheels and a very small part is carried by the towing unit. This type is not at all fitted for the distribution of petroleum products.

The second is the semi-trailer type. The wheels are located in the rear and carry approximately 70 per cent of the load. The front is carried on the rear of the tractor or towing unit and is usually equipped with some form of a fifth wheeel to care for turning and rough roads. This type, while it can carry a greater tonnage, is not as well suited to the distribution of gasoline and other similar liquids as the next following type:

This type has four wheels with the weight about equaly distributed and requires no leg or other supports when uncoupled from the towing unit. Everything being considered this is the type of trailer best adapted to the delivery of petroleum products. The fourth class is the pipe or pole trailer and while not used in the marketing division of the industry is extensively used in the production field in the laying of pipe lines.

Several localities have legislation limiting to two the number of trailers that may be used in a train, and in some cases, to one. This is on account of the trouble experienced in procuring accurate tracking of the rear units and the inability to control the rear end in congested traffic. Under ordinary conditions it is believed that one trailer is all that should be employed in a train in the distribution of gasoline, altho in some cases it is desirable to use two small capacity trailers instead of one large one.

One oil company has worked out a trailer system which under its peculiar operating conditions has turned out extremely well. This should rightfully be termed a relay system of distribution. Their filling stations (eleven in number), and principal customers are located within a radius of from a mile and a half to three miles from the distributing plant. The haul between any two next adjacent stations in the outer circle is not over three miles.

An ordinary truck carrying a capacity load leaves the distributing plant with a train of two trailers each carrying approximately two-thirds of the capacity of the power unit. The destination of the train being any three contiguous stations or customers in need of enough gas to take the capacity of any unit. Each trailer is in charge of a helper (at a considerable less salary than that of a chauffeur) who assists in the uncoupling and coupling and also takes charge of the unloading.

When station No. 1 is reached, the rear trailer is left in position to be unloaded by the helper. The same operation is carried

Two Sides To The Question

THE accompanying article takes up a subject about which there has been no little well-founded argument, pro and con. The fact is that some distributors of oil products have found trailers advantageous to their business. Others have failed to operate them profitably.

The author, Mr. Bean, of the Wayne Oil Tank & Pump Company, is writing a series of discussions on motor trucks and their relation to the distribution of petroleum products. This one, recounts the experiences of some succesful operators of trailers as oil transports.

Undoubtedly his own observation of the mistakes and successes of others is the ground for the opinion herein expressed. He does not claim that his study has been exhaustive or that his findings are infalible, but simply relates interesting happenings and enlarges thereon.

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out at station No. 2 while the power unit goes on to station No. 3 and discharges its own load, then returns to stations No. 2 and 1 and picking up the trailers, returns to the distributing plant where the power unit is reloaded and hooked to additional trailers which were filled while the first train was enroute.

This method never consumes any greater mileage than would be required for the ordinary truck to make three trips and in cases where the stops are located in a line directly away from the distributing plant rather than in a circle, there is a saving in mileage in some cases as high as 50 per cent. There is also a saving of twice the difference between the salary of a chauffeur and helper, an ultimate saving in gasoline, fuel, motor maintenance and time consumed in loading and unloading of two power units.

Trailers should be standardized the same as trucks and it will be found much better to have the trucks designed as towing units when purchased than to install coupling devices afterwards as it is likely to interfere with rear bumper, piping and faucet arrangement or the design of the can box.

A truck carrying its own capacity load can haul a four-wheel trailer carrying an equal load. Some trailer manufacturers claim that it can pull a trailer with twice its capacity load in addition to its own load. But this is not a safe thing to do except under the most favorable conditions which seldom exist.

A good trailer will weigh from one-third to one-half of the rated capacity of the truck which it is to accompany. Therefore a more or less crude rule might be established to the effect that a truck carrying a load equal to its rated capacity can pull an additional load of 150 per cent of its own rated capacity. This 150 per cent is to include the weight of the trailer chassis its body and pay load. The body allowance specified by the various trailer manufacturers vary considerably for trailers of the same rated capacity. Therefore, in determining the tankage to be used it would be best to use one and a half times the rated capacity of the towing unit and from this subtract the exact weight of the trailer to be used.

The tank should then be designed so that its weight, including mounting, when added to the weight of its contents will just equal the difference above noted. A number of engineers claim that a motor truck operated without a trailer is only thirty-three and a third per cent efficient, while others go as high as forty-two per cent. The claim is that a trailer can be operated at a slight increase in total cost, that is, the cost of its own operation is a small percentage of that of the towing unit and with only a slight increase in operating cost for the towing unit and without injury thereto.

The depreciation of a trailer, the maintenance charge for tires and general repairs, should be much less than that for a truck. The tire on a trailer will give something better than double the mileage of those on a truck. The average of figures obtainable as to the comparative cost of operation, while not accurate, are fairly dependable and show that the cost of trailer operation will be about sixteen and two-thirds per cent of that of a truck and that the truck will show an increase of about twelve and a half per cent for gasoline and oil, while other items will not be appreciably affected.

A few years ago the truck manufacturers were opposed to the use of trailers. Today a number of them not only approve but recommend their use.

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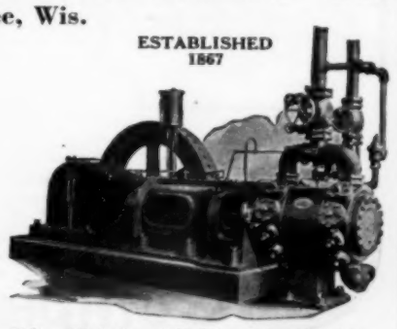

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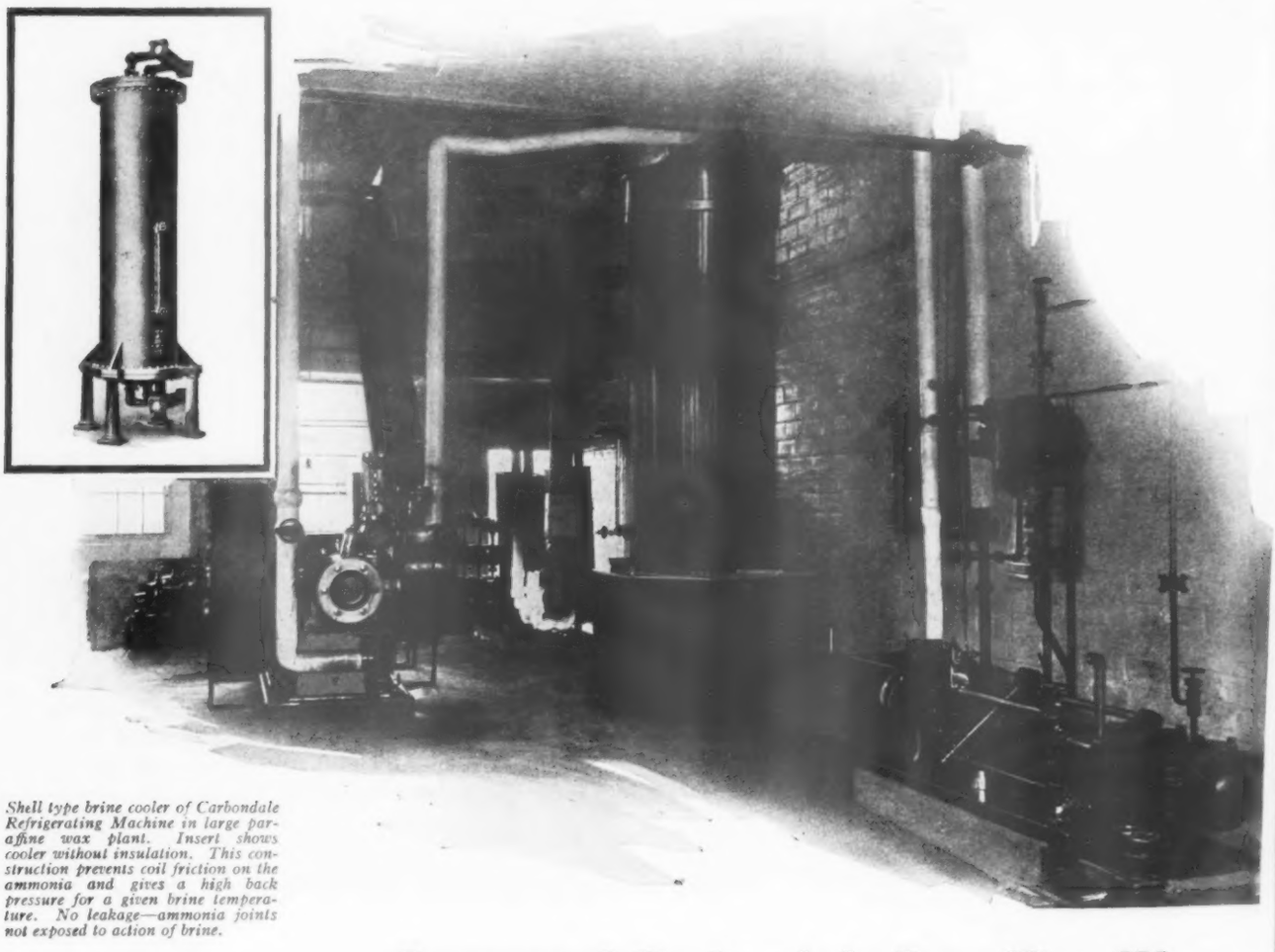

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Nitroglycerin Once Gave Excitement; Not Limited By Hazards In Handling

That time in the early days of the oil industry when the shooting of wells was controlled by a company, is within the memory of many of the older operators, but its history is little known to those who have entered the industry within recent years. Harry Botsford, in the current issue of Pure Oil News, published monthly by the Pure Oil Company, tells of the era when some men courted penalties by shooting wells.—Editor.

PARAFFINE is the unrelenting foe of oil wells. This was the case when the industry was in its swaddling clothes and was confined to the valley of Oil Creek in northwestern Pennsylvania. In the early sixties it became evident that some solution must be found or that the daily production would dwindle to a mere nothing. Scheme after scheme was tried but none seemed to really work. Live steam was turned into wells but this failed also. But oil men—even in those days—were a plucky bunch and refused to be discouraged by the problem.

Finally in 1866 one Harper announced that he would publicly torpedo an oil well owned by John C. Ford, four miles south of Titusville. A large crowd of oil men gathered and watched Harper's preparations with interest and considerable scoffing. Harper took five pounds of gunpowder which he placed in a large, earthen bottle. This bottle was attached to joints of gas pipe and lowered to the bottom of the hole, a distance of two hundred and fifty feet. A red hot iron was then dropped down the pipe and the spectators hustled to a place of safety. The explosion shook the ground and threw out a considerable volume of water and oil and the gas pipe in such force as to partially wreck the derrick. Tubing was placed in the well which was pumped by a horse. The horse worked until tired out and still the well continued to pump.

Before the explosion, the well was practically dry, altho it had once been an average producer. The oil men were satisfied with the experiment. It looked as tho the problem of ridding wells of paraffine had been solved. Harper, elated, formed a partnership with William Skinner and a man named Potter and advertised that he was in business to treat oil wells with powder explosions. Harper claimed that he was the first man to conceive the idea but there are various old time oil men who call attention to the fact that William F. Kingsbury, in 1860, advertised that he would, for a monetary consideration, "put blasts in oil wells to increase their production." But the old time oil men state that Kingsbury never made a successful demonstration of his prowess and that the real credit belongs to John F. Harper and the Ford well was the first one successfully torpedoed.

Mixes First "Juice"

Meantime or rather some time before this, a patient French chemist had perfected a mixture of nitric-acid, sulphuric-acid and commercial glycerine in certain proportions. The combination was a harmless-looking liquid and was called nitro-glycerine. It burned in an oil lamp and gave a good light. But concussion proved it to be the most terrible explosive ever invented. This was in 1846 and the new explosive was not used in any useful art because of its peculiar and uncertain ways of exploding at inconvenient times. It had a small use in the field of homeopathic medicine. A small consignment was shipped to this country to be used for this purpose. A brawny baggage smasher lifted the box from an express wagon and threw it to the pavement. A terrific explosion occured, killing and injuring several people and the New York papers were full of the accident. Nitro-glycerine began to be its own press-agent.

While Kingsbury and Harper were working on the problem of using gun powder in oil wells, Col. E. A. L. Roberts, of Titusville, had been working on the same problem but from a somewhat scientific angle. In 1864, the nitro-glycerine-oil tangle received its initial entrance into oil field history by Col. Roberts applying for and securing a patent for "a process for increasing the productiveness of oil wells by causing an explosion of gunpowder, or its equivalent, at or near the oil bearing point, in connection with superincumbent fluid tamping." He claimed that the action of an exploding shell in a mill-race at Fredericksburg, suggested the idea of shooting oil wells.

In 1865, Robert constructed six torpedoes, using nitro as an explosive powder and proceeded to give a public demonstration of his process at the Ladies Well, near Titusville. The process was a success, as the fluid tamping, caused the force of the explosion to be expended sideward and downward, finally folowing the lines of least resistance, upward and out of the drilled hole. The force being expended in this manner, fissures were reopened and cleaned of clogging paraffine by the heat and force of the terriffic explosion. The Ladies Well at once commenced to flow oil and water and oil men anxiously sought out Roberts to have him use a similar process on their wells.

Reed, Harper and others began suits against Roberts in an attempt to get his patent annuled and these suits lasted for two years and resulted in Roberts' vindication. He at once formed a company, under New York laws, to manufacture nitro-glycerine and to "shoot" oil wells. This organization charged what oil operators believed to be exhorbitant prices for their service and much discontent was caused thereby.

In a determined effort to defeat the Roberts Torpedo Company, the famous and unprecedented nitro-glycerine war was started. Law suit after law suit was brought against the Roberts organization and Roberts brought hundreds of suits against others for infringements of his patent. Roberts gathered around him the best legal talent in the United States and the oil men organized and did likewise. More than two thousand law suits were in progress at one time over the patent and infringements.

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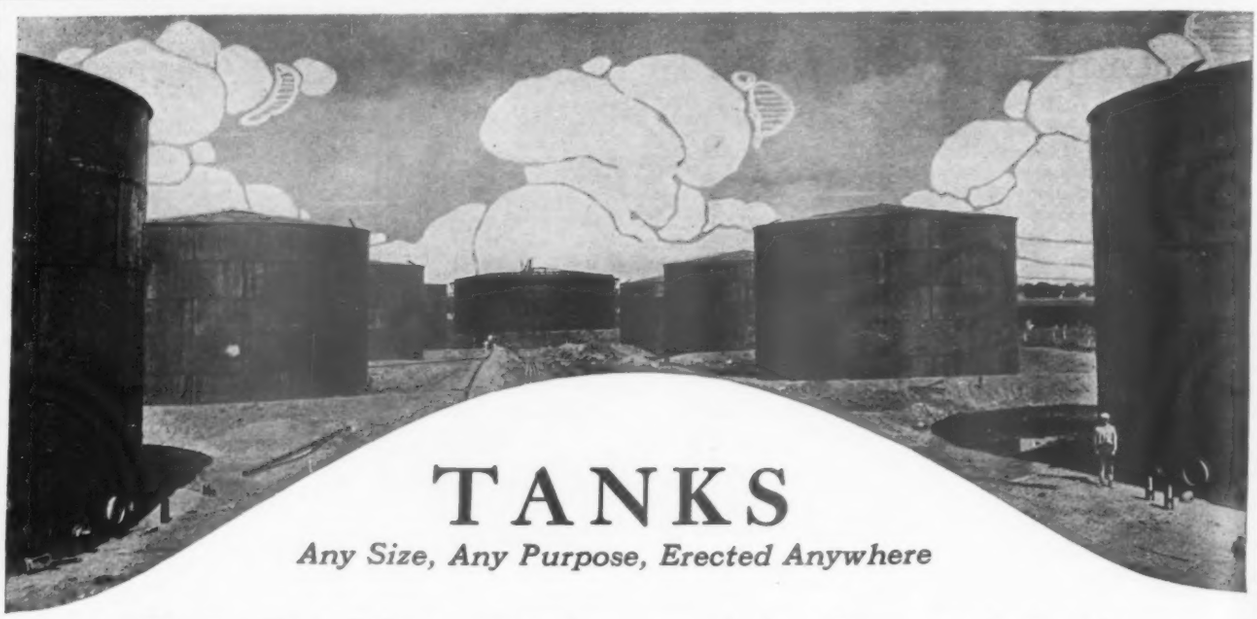

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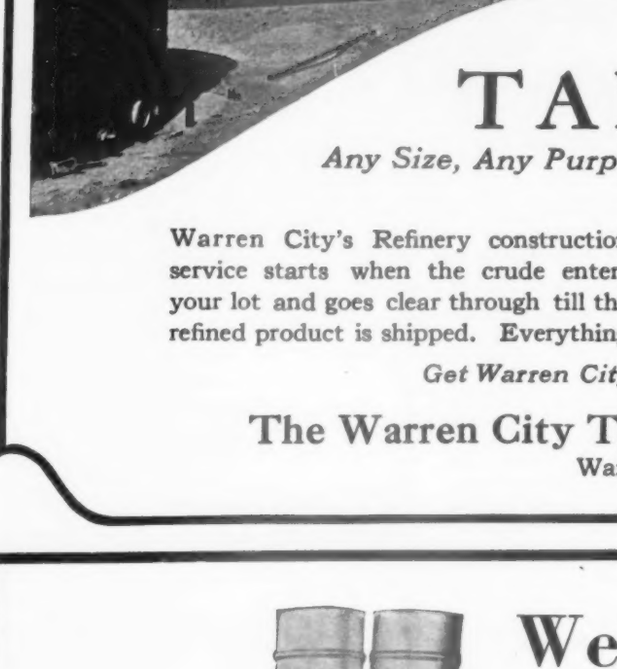

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ment with a strong dash of danger and a possible opportunity for making money, began to manufacture nitro-glycerine in the hills in the oil fields. Their mixture was made in huge, earthen jars and mixed entirely by hand. When night came, these men who refused to pay revenue to the Roberts crowd, would fill jugs and cans with the nitro and climb over the hills to a well some like-minded oil man wished to torpedo. Moonlight nights were in great favor as it gave the man a trifle better chance for his life. A stumble in the darkness or a single misstep or a moments' carelessness meant death—death that came in a great blinding flash of light and a thunderous explosion that would mean the grave of some adventurous "moon-lighter." Moonlighters led a lively existence, while they lasted; the Roberts organization enlisted the services of a national detetcive agency to protect them and these men cruised the hills and oil fields day and night looking for evidence of any infringements on the Roberts patent.

Roberts Defends Patent

Year after year, the nitro-glycerine warfare went on, neither side fighting fairly. It has been alleged that both sides attempted to buy the good-will and favor of witnesses, judges and juries. But in the end, the Roberts Torpedo Company won nearly every suit brought against it and not a few of the two thousand suits, they, themselves, brought against men who made infringements on the original patent. Oil well owners had but two choices: they could hire, for a reasonable price, the services of a moon-lighter to torpedo their well, knowing that his very methods might spoil the oil well, destroy property and lives and make the oil man liable for an infringement of the Roberts patent, or he could pay the high price asked by the Roberts company and have his well properly torpedoed in daylight and without any fear of the hand of the law falling on his shoulder. But oil men were about evenly divided in their personal opinions and many who used the services of the Roberts company, did so under protest and had every sympathy with those who violated the law and engaged the services of the moonlighters.

The Roberts' patent was re-issued in June of 1873, perpetuating the burdensome load on the oil producer. Oil men failed to be discouraged, however, and in 1876 suit was brought in the circuit court against Peter Schreiber, charged with infringing the Roberts' patent. Schreiber's process practically duplicated the unpatented Crocker cartridge and Roberts wanted Schreiber's scalp the worst kind of way. Schreiber, however, was a fighter. He fought the case for four years and it finally came up for final argument in May of 1879. Henry Baldwin, James C. Boyce and J. H. Osmer represented Schreiber. By this time, the case and the nitro-glycerine war had attracted country-wide attention and the subject was discussed at every drilling well, pump house and wherever oil men gathered. Great crowds gathered to hear the conclusion of the case. Boyce was a young attorney and a very brilliant one; he had spent four years gathering and compiling a great mass of evidence that seemed to clearly indicate to those present that the Roberts patent would be declared invalid. He called upward of fifty unimpeachable witnesses to prove that Roberts had not originated the idea on which his patent was based. But Justices Strong and McKenna, who heard the case, decided against Schreiber and sustained the

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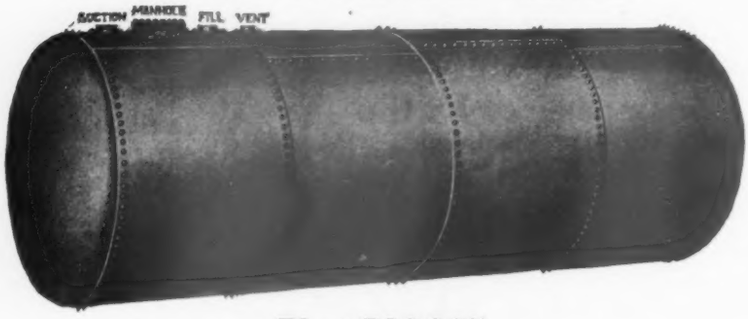

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Cut No. 11
For Air and Water at the Curb

Roberts patent. Schreiber who had spent over $35,000 fighting the case decided not to appeal to the Supreme Court. Luck seemed to favor the Roberts organization too much!

Years elapsed before the patent expired and the evidence Boyce had so painstakingly gathered did much to prevent a reissue of the patent. The Roberts organization amassed great fortunes on the Roberts patent and Roberts himself became very wealthy. Roberts was a scientific man and a good business man—a rare combination. Many of the modern improvements in dental science owe their origin to Roberts. He was, at one time, associated with his brother W. B. Roberts, in the dental manufacturing business. The American Institute awarded him several gold medals for his excellent work in this line. Before his death, he did much for the city where he had established headquarters for his company—Titusville. The Brunswick Hotel, conducted by his brother, C. J. Roberts, was erected by E. A. L. Roberts and was once the most palatial hotel in the Pennsylvania oil fields. He was generous to a fault with his friends, and it was, for years, his custom to reimburse the landlord of the Brunswick for any deficiency in the books, his sole provision being that the hotel should be conducted in the best of style. His funeral was one of the largest ever held in the city. His body was laid to rest in Woodlawn Cemetery, at Titusville, where Col. Edwin L. Drake and other old time oil men are sleeping the last sleep and his monument is most unique as it is constructed emblematic of the torpedo used to "shoot" oil wells.

Says Acreage Price Was Over-Estimated

In an article on southwestern Kentucky in the November 10 issue of **National Petroleum News,** this statement appeared on page 65 under the heading, "Simpson County":

"Drilling is going on in southwestern Simpson county down to the Tennessee line, with several small wells reported. The prices asked for acreage doubtless holds development back some, as practical operators will not pay $300 an acre for 5-barrel stuff."

C. E. Litteral, of the company which bears his name, Franklin, Kentucky, in a recent letter takes issue with the statement as to the price of acreage. Mr. Litteral has been handling oil properties in this part of Kentucky for a considerable time. His statement as to the prices prevailing is as follows:

"We are perhaps the largest handlers of Simpson county acreage, having under our control about 10,000 acres of Simpson county leases. Our prices for same run from $5 to $50 per acre, and the latter price includes off-set acreage. So far as our knowledge extends, no acreage has been sold in this country, or in Franklin, for $300 an acre."

After a long delay, Acme Petroleum Company has succeeded in having a private wire installed between its Chicago, Kansas City and Tulsa offices. The company remarks that the big increase in its business has made a private wire as essential as tank cars.

LUBRICATING *and* INDUSTRIAL OIL ENGINEERING

by John Rome Battle

(J. R. Battle Company, Engineers, Philadelphia)
Associate Member American Society Mechanical Engineers
Editor of Lubrication and Industrial Oil Engineering Department

Urges Salesmen To Emphasize Danger Of Gasoline Fires And Explosions

Article 5

The duty gasoline salesmen and others who have to do with the distribution of gasoline owe to the public and to their employers in emphasizing the hazards attendant to its handling is pointed out in the accompanying article by Mr. Battle. This is the fifth in a series dealing with the handling and storage of petroleum products. When it is realized, as Mr. Battle asserts, that heavy loss of life has resulted from gasoline fires and explosions of gasoline vapors, the subject is one of serious importance. Every salesman can find something in this article to reinforce his arguments for carefulness in handling gasoline.—Editor.

IT will probably interest the reader to know that, in one year, there were over 1,000 persons burned to death, and over 3,000 injured, as a result of fires and explosions, which were traceable to gasoline.

Undoubtedly the major proportion of gasoline fires and explosions, occurring on the premises of consumers, are due to carelessness, ignorance, and a lack of knowledge of the characteristic properties of gasoline, on the part of the consumer.

It is the duty of every gasoline salesman, tank wagon man, and garageman, not only to urge that proper precautions and all fire underwriters' and municipal regulations be observed in handling and storing gasoline, but these men themselves should be equipped with at least a general knowledge of the principal rules governing the safe utilization of volatile petroleum products.

Gasoline vapor will mix or mingle with the air in a manner similar to water vapor. At any particular temperature the amount of gasoline vapor which will be carried by the air is proportionate to the air temperature, and the grade of gasoline involved.

It is well known that water vapor will be found in a definite proportion in the atmosphere, at any specified temperature, if the atmosphere has become completely saturated with the vapor. This condition rarely exists, since usually only a limited amount of moisture has been given off to the atmosphere, and the atmosphere in this case is referred to as having a "certain relative humidity," which means that more of the water vapor could be carried in the air at that temperature if a source of more moisture were available.

This is a parallel condition to that existing with gasoline vapor, since the possible richness of the air with regard to gasoline vapor depends both upon the temperature of the air and the availability of the source of the vapor.

When gasoline is exposed to the air in a room, for illustration, for a sufficient length of time the air in the room will, for the temperature present, carry a certain proportion of gasoline vapor. The proportion will differ for the different grades of gasoline, but it will only be up to a certain quantity, according to the air temperature.

Roughly, at approximately 64 degrees Fahr., the proportions of gasoline vapor that the air will carry range from about 5 per cent for "cleaners naptha" to about 28 per cent for 73 degrees Be. gasoline.

Gasoline has peculiar habits, with regard to a flame. For instance, if we have a full container of gasoline, with an open top, should a match be applied to the surface of the gasoline, the fluid will flare and burn fiercely as long as the gasoline lasts. On the other hand, if we put a little gasoline into a closed container, and allow it sufficient time to vaporize into the air in the container, a violent explosion will probably occur, should a flame be introduced to the resulting air and gasoline vapor mixture. Thus, a gasoline explosion is the result of a mixture of gasoline vapor and air, plus a spark or flame.

Gasoline Explosive Force

Just how violent a gasoline vapor and air explosion is, can be imagined, when we realize that it is estimated that when one gallon of gasoline is completely vaporized under favorable air conditions, and ignited, the developed explosive force is about equal to that resulting from "letting go" 83 pounds of dynamite.

Certainly the most careless garageman or automobile owner would not become overly familiar with 83 pounds of dynamite, but how often do we see a gallon of gasoline handled by the user as tho it had no more dangerous qualities than a gallon of ordinary spring water.

A pint of ordinary gasoline will, on evaporation, render about 200 cubic feet of air explosive.

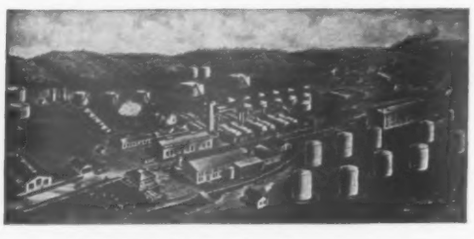
Gasoline vapor is heavier than air, and when freely liberated in a room, settles to the floor, in a sort of a strata. This vapor likes to travel, and has been known to flow along a floor, or down into a pit, in an invisible blanket-like cloud, to some comparatively distant lit cigaret stub, which may ignite it, causing a "flash back" to the source of the vapor, and instantly producing a fierce fire.

Probably it is a fortunate fact that "gasoline vapor and air mixtures" are explosive only when the gasoline vapor is present in the air within certain limiting proportions. Roughly, these proportions, or limits, range from about 1.4 per cent to about 6 per cent of gasoline vapor, to 100 parts by volume of air. Investigators have found that while flame flashes will occur in gasoline vapor and air mixtures outside of these limits, when in contact with a flame or spark, propogation or extension of the flash thru the mixture will not occur.

An important fact to be appreciated is that the lower limit of explosive proportions of a gasoline vapor and air mixture is quite low, being about 1.4 per cent. It is, therefore, evident that in a small garage, for illustration, with the windows and doors closed, as is common in the winter months, comparatively little gasoline need be spilled, or used for cleaning the car motor, etc., to provide sufficient gasoline evaporation to set the stage for the careless visitor and his pipe or cigaret. Then, the next development is an ambulance or the undertaker.

Let us assume that a small, heated, privately owned garage measures 10 feet by 10 feet by 21 feet, and that the windows and doors are closed, rendering it practically gas tight. Now, one gallon of gasoline if allowed to vaporize completely will furnish sufficient vapor to render explosive 2,100 cubic feet of air, or just the cubical contents of the garage.

An ideal condition such as this is not likely to exist, but should an open container of gasoline be filled from a tank, there will be a pure, heavy gasoline vapor directly over the gasoline surface. Above this will be a rich mixture of vapor and air, and somewhere above this strata will be found an explosive mixture. As the user of the gasoline continues to permit the evaporation to continue, more and more of the explosive mixture surrounds him, and a



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spark or flame will cause an enveloping flash, with various consequences.

Gasoline does not mix with water. It is a non-conductor of electricity and it is interesting to note that gasoline has been known to generate sufficient electricity (frictional), when being strained thru a fabric strainer, or passed thru a hose, to produce an electric spark which ignited the inflammable vapors of the gasoline, with disastrous effect.

Many persons refuse to believe that garage fires may arise from frictional or static electricity, caused by filling containers thru improperly grounded connections. However, the insurance companies and some municipal authorities have recognized this possibility and have taken steps to guard against this possibility.

The main principle involved in guarding against frictional electricity is to provide a good metallic connection between the storage tank and the container or tank being filled, so that the electricity is grounded, as generated.

One recommendation to meet this condition, which has come to the writer's attention, is to use only a can with a metallic bail when taking gasoline from a pump tank into a can, so that the can will be hung by a conductor to the pump while filling, thus grounding any electricity. Also, where the filling is by means of a hose from a storage or a portable tank, the hose should embody a metallic connection with the pump at one end and the delivery nozzle at the other.

Some investigators, as the result of their studies, have advised against the use of chamois skin as a filter or strainer in the filling funnel and recommend the substitution of an 80 or 90 mesh wire gauze, which is said to equally well exclude any water. The chamois skin being believed to gather frictional electricity as the gasoline passes thru it, which collects on the funnel until it reaches sufficient strength to produce a spark.

Standard Enters France; Shell Stock Goes Down

PARIS, Nov. 18.—The news that the Standard Oil Company had established a branch in France and that negotiations between Chairman A. C. Bedford and the Banque Le Paris des Pays Bas had resulted in the organization of a subsidiary company of which M. Jules Cambon, late French embassador to London, is chairman, caused a sensation on the street market (the Bourse having already been closed) and on the oil section, where there were extraordinary fluctuations.

Royal Dutch dropped 400 francs and Shell fell eight points below the previous day's closing price. The general feeling is that this is the beginning of a struggle between the two most powerful oil groups, negotiations between them having failed. Formalities for the construction of a large storage station outside Paris have already been concluded. The new company is known as the "Economique." Another report, emanating from Germany, states that the Banque de Paris is on friendly relations with both the Royal Dutch and Shell interests and that a trade war is not likely.

Two Months' Fuel Run Stored In California

By Special Correspondent

SAN FRANCISCO, Nov. 19.—Storage stocks of oil have been reduced to a surplus of only two months' average consumption and the situation is rapidly growing worse, according to a report made to the San Francisco Chamber of Commerce last week. This report represents two months' observance and compilation of information by a committee appointed to make a survey of the oil situation.

In a resume of the findings the chamber says:

"As the fuel oil situation presents itself today, the supply of California crude oil faces a shortage of 28,000 barrels daily. The 'cracking process' is estimated by well informed men to involve an additional draft of almost 22,000 barrels a day by the first of 1921, provided the present rate of production remains unchanged."

The surplus stock of crude oil in California pools has decreased from 57,000,000 barrels to 23,000,000 since January, 1916, according to the report. Consumption has increased rapidly, but production has failed to keep pace, as only three per cent more fuel oil has been produced since 1917 in the winter months.

The recommendation that electric power should be extended in every possible way has already been put into effect by the power companies, and the report gives renewed interest to the revival of reports frequently circulated before to the effect that the Southern Pacific plans an early electrification of its California lines. The report has been most frequently heard in connection with the mountain divisions, notably the joint Southern Pacific and Santa Fe line over the Tehachapi pass between Los Angeles and Bakersfield. The decision of the Southern Pacific to separate its oil interests from the railroad, probably to sell both the company's own oil lands and its Associated stock, has revived the report of electrification as explaining why the company is willing to give up its title to an assured fuel oil supply just when all other consumers are struggling to get enough and general shortage threatens. According to believers in this theory, the Southern Pacific will use the money from the sale of its oil properties to electrify its lines and say that, even after paying the enormous war tax, the proceeds of such sale will go far towards paying for the transformation to motor power. However, before any change is made more water will have to be developed. While such development was in progress the railroad could, it is held, assure itself of a fuel supply by contracting for it in the same agreement that it surrenders title to its lands.

Engineers are agreed that but a fraction of the water power available in California and adjacent states has yet been developed.

Among the recommendations submitted to and considered by the committee was one that the navy and Shipping Board should bring Mexican oil to California for their own use, a move which apparently the Shipping Board has

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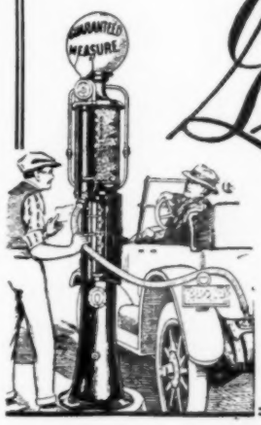

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taken some interest in, as Admiral Benson has admitted that it is concerned in a plan for a pipe line across the Isthmus of Tehuantepec. The fact that Secretary Daniels has just ordered the increase of the Pacific fleet by seven additional battleships, making it practically equal in strength to the Atlantic, making the problem of fuel more serious, and it is quite likely that efforts will be made to convince Daniels or his successor of the necessity for relieving the situation by bringing Mexican oil here.

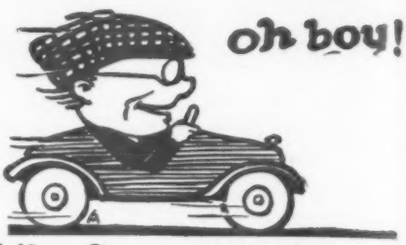
Despite the fuel situation which all who understand want settled, public opinion on the Pacific coast favors the strengthening of the fleet. While not excited or expecting any immediate disturbance there is no doubt a strong feeling that there is at least a possibility of trouble with Japan over the immigration question if the naval force is not strong enough to command respect. The oil companies are and always have been ready to supply the navy, the only question is over Daniel's arbitrary price fixing.

The secretary has just succeeded in forcing the General Petroleum and the Shell company to come down to $2 per barrel for the navy. The first bid $2.25, the second $2.35.

How Flame Travels In Motor Cylinder

Interesting experiments have recently been made in England as to the movement of the flame in internal-combustion engines as it starts from the spark and spreads thruout the cylinder. These flames are photographed as they travel along in a horizontally placed glass tube. The position of the spark with reference to the walls and the shape and size of the explosion chamber are found to greatly influence the movement of the flame and the rapidity of combustion in the flame. When ignition is effected, sound waves are also started which travel thru the unburnt gas faster than the flame moves. This sound-wave reflected from the nearest wall penetrates the flame, promoting combustion and increasing its rapidity. A similar sound-wave reflected from the further end crosses the flame in the opposite direction, and these sound-waves, crossing and re-crossing the vessel are visible as long as the gas is burning. The flame is much more intense in the path of these waves than when originally lit and traveling thru the unburnt gas.

In an explosive mixture the flame starts slowly and with small luminosity, it gathers speed as it travels, and if the vessel holding the gas is long enough it may suddenly develop the explosion-wave. At this point the whole character of the flame changes; it is intensely luminous, for the combustion is very rapid, and it proceeds at a perfectly uniform velocity. At the point where the explosion-wave—the "detonation"—starts forward, a wave of "retonation" is thrown back. The effect of the explosion-wave on the walls of the vessel is like that of the blow of a hammer; it has a shattering effect, but is of little use in driving forward a piston. It has been observed that alcohol takes a longer time to develop an intense combustion than does petrol.



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Manufacture Of Lubricating Greases More An Art Than A Science

Almost as old as the commercial knowledge of petroleum is the manufacture of greases from mineral oil, compounded with oils of vegetable and animal extraction. Before the use of mineral oil, or petroleum, was evolved, mankind was dependent chiefly on animal fats for the lubrication of such machinery as had been put to work, altho, broadly speaking, machinery requiring constant lubrication is contemporaneous with the use of petroleum. Grease-making has been little understood except by those engaged in it and for that reason the accompanying article discussing four generally used types of greases is re-printed from the September issue of "Lubrication," published monthly by the Texas Company. —Editor.

UNDER the general name of "greases" are found some of our most important as well as oldest lubricants. While oils, generally speaking, give somewhat less fluid friction than greases and great strides have been made in developing lubricating systems using only oils, yet there are many cases where ease of application, inaccessibility of bearing or some special property demanded in the lubricant prohibit the use of oil and require that of a grease altho there may be some slight increase in fluid friction occasioned by its use. These requirements have led to extensive study of the action and properties of the various grease-making materials in an endeavor to improve the lubricating qualities and eliminate some of the drawbacks of older grease lubricants. While a large amount of data has been accumulated and some scientific explanation of reactions can be given, still results are mostly obtained empirically and the success of a product depends to a large extent upon the experience and skill of the manufacturer. The manufacture of lubricating greases is more of an art than a science and the grease maker is the artist.

It would be next to impossible to write out a formula and method of manufacture of many of the greases now on the market. Some of the characteristics can be definitely predicted from the stocks from which the grease is made, but the fine points of the product, such as, uniform color, texture, consistency, gloss and ability to remain uniform depend on the art of the grease maker. So much depends on him that it is possible to take two batches of exactly the same composition and make two greases of entirely different characteristics. It is even possible to put the same compound in two different kettles and heat them to exactly the same temperature and have one product fluid and the other very hard.

In making practically all greases, the product is drawn from the kettles while still hot and fluid into the permanent containers. So far no tests have been devised to guide the grease maker in judging his batch. It is necessary for him, therefore, when making a batch of say No. 3 cup grease to be able to tell not what the grease actually is when it is drawn, but to estimate what it is going to be several days later when it is thoroughly cold.

Some greases undergo a change in characteristics for some weeks after being made and these possible changes must be taken into consideration while the batch is still hot. This should make it plain how difficult it is to make all batches of one product exactly alike, and the grease maker who can make batches day after day of fairly uniform characteristics is an artist.

The greases that are on the market today with the exception of some specialty greases can practically all be classed under four heads.

The first are cold set rosin greases usually known as axle greases. They are made by mixing while cold the proper proportions of mineral oil, rosin oil and lime or "set." The mixture will solidify in about three minutes and the resultant product should have a good body, be uniform and remain uniform.

This class of greases are comparatively easily made. The skill of the grease maker is shown in a choice of stock and ability to make a smooth grease that will not separate.

Cup Greases

The great majority of greases on the market belong to this general class. The basic principle of manufacture of all cup greases is the same. The nature and proportion of the different ingredients and the method of handling the batch makes the difference in the final product. Whether the product is on the market as a fluid comb box oil or as an almost solid No. 5 cup grease makes little difference in so far as the method of manufacture goes.

All greases of this class are made by saponifying a fatty oil with lime and incorporating the necessary amount of mineral oil to bring the grease to the desired consistency. In no other grease product is there such a chance for the exhibition of the skill and knowledge of the grease maker as in the manufacture of cup greases.

When it is required to meet a certain specification or match a certain grease, he must first determine the fat or oil that he will use. Some of the fats; such as, horse oil and palm oil, will give the grease a high melting point. Palm oil will give it both color and odor, while horse oil will give it a disagreeable odor but will give it a smoothness hard to obtain with other fats. Other oils; such as sova bean oil, will make a soft, slimy product of low melting point.

Your grease maker must decide what fats or combination of fats will give him all of the characteristics desired. He must then decide the proper proportion of lime to use. It is an easy matter for any chemist to calculate the exact amount of lime necessary to completely saponify any oil; but the fact that leaving a slight amount of unsaponified fatty oil or having an excess of lime will very decidedly change the characteristics of a grease must be known and taken into consideration by the grease maker.

The kind of fat and the proportion of lime being determined, it is still necessary for the grease maker to decide on the kind of mineral oil to use. As the mineral oil will change the characteristics of the grease the work to which the grease is to be put, should be taken into consideration in order that an oil will be present which will handle the lubrication of the machinery to which the grease will be applied. After the composition of the grease has been determined, it is a comparatively easy matter for anyone to make a grease which will be dull and have no luster and will in all probability have lumps. The skill of a real grease maker is taxed to the limit, however, to make a batch which is bright, has a luster, is absolutely smooth and shows no indication of separation even after long standing.

The two points which require the greatest skill on the part of the grease maker are to get his batch bright without causing a separation and to have his batch the right consistency. It is necessary to have a certain amount of heat in order to brighten the batch, but the slightest amount of excess heat will cause the batch to separate, and once it has separated it is impossible to get it to reunite.

Sponge Grease

Sponge grease is a soft fibrous grease having a very high melting point. It differs from cup grease in that it has a soda base instead of a lime base. The peculiar fibrous or spongy texture is caused by the way the batch is handled in the kettle. True sponge grease does not lend itself to as many variations and is not so hard to make as cup grease.

There has comparatively recently come on the market greases which, while they are not true sponge greases, would come under this general class—these are high melting point smooth greases. The base of these greases are usually a mixture of soda and lime soaps. The smooth texture is caused by the temperature and method of handling the batch in the kettle. These smooth greases require much more skill and knowledge on the part of the grease maker than the older sponge greases.

A large variety of greases can be made by variations of this method ranging from almost straight cup greases to straight sponge greases. This class of grease furnishes a large field for the ingenuity of the grease maker.

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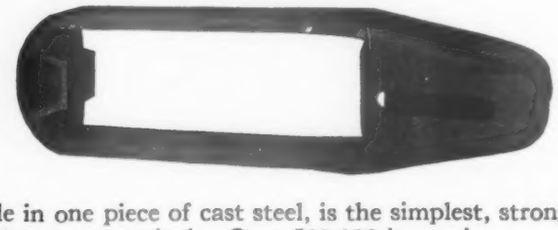

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we refer to driving journal and rod cup grease. While these greases are used for different purposes and are somewhat different in nature, their general characteristics and method of manufacture are the same. Here it is necessary for the grease maker to know before starting his batch exactly what he will get from the proportions that he puts in his kettle, for he has no chance to correct his batch after starting. These greases are made by the cold saponification of fats with caustic soda when mixed with the proper amount of a high-class mineral cylinder oil. Saponification takes place slowly and as soon as the batch starts to thicken, it is necessary to draw it into its permanent containers where the reaction continues for several days. A little mistake on the part of the grease maker in charging his kettle would make a total loss, for this grease cannot be worked over and if it is not exactly right it is impossible to correct it.

Besides the four classes of greases mentioned above there are many specialty greases, some of them more or less of a freak nature, but the principle of manufacture back of most of them would place them under one of the four above mentioned classes.

In the manufacture of all greases two things are of the greatest importance—these are the knowledge and skill of the grease maker. His knowledge is required to make his batches of the proper color, consistency, brightness and hardness.

The manufacture of greases demonstrates quite clearly the value of experience in lubricating engineering. The knowledge of the proper handling of materials to produce the best greases was only obtained after a large number of experiments and, as shown in the foregoing, this knowledge of handling is one of the most important factors in obtaining the best quality of product. While specifications can be drawn to indicate the chemical composition desired in a grease, they are of little value in determining physical structure and lubricating qualities. It is far better to take the judgment of the lubricating engineer of a reputable company in the selection of a grease than to try to pick a product on its chemical composition and apparent consistency, knowing nothing of the care in its manufacture. The engineering experience of reputable companies is very broad, and the more reliable the company the more apt it is to have grease makers of the highest class.

As showing the improved oil-handling facilities brought about by the modern tanker, Mr. G. Howell, in a paper recently read before the Imperial Motor Transport Council, London, stated that a ship of 18,000 tons deadweight capacity can be discharged in 18 hours, whereas, if the oil had been transported in barrels, the volume of the oil would have been 18 per cent less and the time of discharge would have extended over several days.

It is estimated that the Barco oil concession in Colombia, if divided into 160-acre farms, would make a continuous line of farms one-quarter of a mile wide, extending a distance more than enough to encircle the globe.

Associated Co. Plans Extension Of Sales

By Special Correspondent

LOS ANGELES, Nov. 18.—Associated Oil Company intends to enter aggressively into competition for the oil and gasoline business on the Pacific coast, according to plans made known to the public here last week. These plans encompass, it is said, the establishment of fuel oil stations on the coast and the extension of the gasoline service station system of the company along Pacific coast highways.

Such a plan evidently has been contemplated for some time as an extensive development program has been carried on which will enable the company to fill increased demands. Since June 1, the company has increased its string of drilling rigs from 39 to 54 and is now engaged in operations in Colorado, Nebraska, Texas and California.

Much interest is shown as to whom the managing official of the Associated will be after the segregation from the Southern Pacific, and the name of Paul Shoup is connected with several rumors. Shoup, who has been closely connected with the management of both the Southern Pacific and Associated, is credited with the conception of the aggressive policy of the oil company.

It is not considered likely that an executive officer of the Southern Pacific, under the new policy, will remain the directing head of an alien company. Just what move will be made by Shoup, as to his future affiliations, is the subject of much speculation among financiers, railroad men and oil men.

Issue Revised Map Of Hewitt District

A revised map of the Hewitt field, Carter county, Oklahoma, will be issued immediately by the Petroleum Station of the Bureau of Mines, Bartlesville, Okla., an announcement from that place says.

The present condition of the fund allotted to the Bartlesville station is such that the Bartlesville Chamber of Commerce has assumed the financing of the engraving and printing and will mail them to persons desiring them upon receipt of 35 cents for each print.

The map is drawn to scale of one inch to 1,000 feet and shows locations of all drilling rigs, producing wells and abandoned holes in township 4 south, range 2 west up to the date of November 1. In addition, derrick floor elevations for every rig and well in the Hewitt field are given, and such information as drainage, location of tank farms, towns, etc., and geological structure contours on the Hewitt sand.

New national standard of wages and working conditions for all men engaged in refining, grading, transport and distribution of mineral oils and by-products in Great Britain is being formulated by a joint committee of the National Federation of General Workers and the National Transport Workers' Federation.

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REFINERY-TANK WAGON MARKETS

Gasoline Cut In Southern States

THE past week saw another reduction in the retail price of gasoline over a wide area in the southern states when the Standard Oil Company of Kentucky, effective November 22, reduced the tank wagon price 1 cent a gallon in its marketing territory embracing Kentucky, Georgia, Alabama, Mississippi and Florida. Kerosene was also reduced by a half cent or 1 cent at some points in the territory.

There is no change in the tank wagon price of gasoline in the Standard Oil Company of Indiana's marketing territory, embracing eleven of the middle western states, altho a cut in that territory has been expected for some time in line with the cuts posted recently by the controlling marketing companies in other territories.

Expect Little Change Before January 1

The market for refined products is likely to become worse before it gets better, and there is little likelihood of any significant upturn in prices before the first of the New Year. That sums up the view taken generally of the situation by students of the market in the various refining and marketing centers. Some of these believe that the lowest ebb of the market has about been reached while others look for still further recessions.

That the industry in general, however, is little worried at the depressed condition of the market prevailing just at the moment, is indicated by the numerical strength of the attendance at the three-day meeting of the American Petroleum Institute at Washington, November 17, 18 and 19.

Consider Industry from World Viewpoint

Hundreds of oil men from all branches of the industry left their plants with their local, immediate problems and went to the meeting to consider the industry from a world-wide viewpoint. It was significant that the question of immediate market prices and prospects was hardly spoken of at the meeting, and those who attended, to judge by the tone of their remarks, went home with the conviction that the problems facing the industry will be solved as the problems that have confronted it before have been solved.

Probably the fact that many of the refiners and other oil men were at the convention was a factor in the slowness of the trading that characterized the week at all the refining centers. Some of the refiners in the western Pennsylvania district report there signs of a quickening demand for fuel oil, some of them receiving inquiries in considerable volume. Fuel oil showed some strength at the Mid-Continent plants and the gas oil decline was checked by some heavy purchases.

Smaller Plants Report Lower Prices on Lubs

Staff Special

HOUSTON, Nov. 21.—Altho some of the smaller lub plants in south Texas report slightly lower prices, the larger refiners are holding firmly to earlier quotations. One refinery's contract business at the high range of prices will exceed all previous similar periods in volume. That refinery is not pushing sales, preferring to allow smaller plants with congestion of finished products an opportunity to take care of spot requirements.

These smaller plants for the most part, however, are quoting rather than selling stuff, most of this type of plant managements describing demand as slack and prices weak.

Decline Of Gas Oil Is Checked By Purchases

Staff Special

TULSA, Nov. 21.—Market conditions in the Mid-Continent field show but slight change over last week, and the outlook for refiners is still far from hopeful. On the other hand, refiners are thankful that a reduction in the tank wagon in Standard of Indiana territory has not followed the recent cut in the Standard of Louisiana and New Jersey trade areas, tho this cut is expected to occur within the next ten days, as indications are that the Standard will be unable to maintain the present price structure.

Purchase of some 700 cars of 64-66 and new navy gasoline by the Export Oil Corporation at prices above the spot market, has in many cases caused refiners to hold this product for better prices. However, this may be considered but a temporary situation, and unless the Standard of Indiana, California or some other large purchaser with ample storage facilities enters the market shortly, gasoline prices are certain to reach lower levels.

The effect of the large purchases of kerosene by the Standard of Louisiana has not as yet worn off, and burning oils continue to stand firm at last week's quotation.

The acute congestion in Breckenridge in the general Ranger territory of the black lime producing area of north Texas, which threatens a local reduction in crude, is having an adverse influence on the price of Mid-Continent

(Continued on page 124)

Refinery Markets On All Products

Pennsylvania, Oklahoma, North and South Texas

FOLLOWING are the average market prices on the more important petroleum products in cents per gallon f. o. b. refinery in Oklahoma, Texas and Pennsylvania. These are actual prices at which the bulk of each product is moving from the refineries at the present time. Anyone having knowledge of different prices which have obtained on any considerable quantity of any of the products mentioned will greatly favor us by advising us at once.

GASOLINE AND NAPTHAS

Pennsylvania	Prices Nov. 22	Prices Nov. 15	Prices Oct. 25
54 Naptha	22 –22¼	22½–22¾	23
56 Naptha	22¾–23	22¾–23	23½
58 Naptha	23¼–23½	23¾–24	24
60 Straight-run gasoline	23¾	24½–25	24½
62 Straight-run gasoline	24¼–24½	24½–25	25
64 Straight-run gasoline	25¼–25½	25 –25½	25½
68 Straight-run gasoline	26¾–27½	26 –27	28
68-70 Blend, 460 end point	22½	23 –24¾	24½–25
60-62 Blend, 450 end point	22½	23 –23¾	23½–24
62-64 Blend, 450 end point	22½	23 –23¾	23½–24
66-68 Blend, 440 end point	22½	23¾	23½–24
68-70 Blend, 440 end point	22½	23½–24	23½–24
68-70 Blend, 420 end point	22½	23¾–24	23½–24
Oklahoma			
50–52, 450 end point	18 –18¼	18 –18½	19 –19½
56-58, 450 end point	18 –18½	18¼–18¾	19¾–20¾
58-60, 430-440 end point	18½–19	19 –19½	20¼–20¾
60-62, 400 end point	21 –21½	21 –21½	22¼–22¾
62-64, 375 end point	22 –22¼	22 –22½	23¼–23¾
64-66, 365 end point	23 –23½	23 –23½	24 –24½
58-60, 140 i. b. p.-428 end point	19 –19½	19½–19¾	20½–21
80-84 Raw Casinghead	20 –21	20 –21	20 –21
68-70 Blend, 430-435 end point	18¾–19¼	18¾–19¾	19½–20
66-68 Blend, 450 end point	18½–19	18½–19	19¼–20
60-62 Blend, 450 end point	18½–19	18½–19	19¼–20
58-60 Blend, 440-450 end point	18½–19	18½–19	19¼–20
74-76 Absorption Gasoline	22½–23	22½–23	23 –23½
North Texas			
52-54, 460-470 end point naptha	17 –17½	17 –17½	17¾–18¼
54-56, 450-460 end point naptha	17½–18	17½–18	18 –18½
56-58, 450 end point gasoline	18 –18½	18 –18½	18½–18¾
58-60, 440 end point gasoline	18 –18½	18¾–18¾	18¾–19¼
60-62, 400 end point gasoline	21½–22	21½–22	23 –23½
64-66, 360-375 end point gasoline	22 –22½	22 –22½	23¼–23¾
New Navy Specification gasoline	18¼–18¾	18¾–19¼	19 –19½

BURNING OILS

Pennsylvania			
45 Prime White	12 –12½	12 –12¾	12½–12¾
46 Water White	12¾–14	12¾–13¾	13¾
47 Water White	14 –14½	14 –15	14½
300 Burning Oil	12¾	13 –13¼	13
Oklahoma			
42-43	8½– 9	8½– 9	9 – 9½
44-46	12 –12½	12 –12½	14 –15
42-43 Distillate	8¼– 8½	8¼– 8½	8¾– 9¾
North Texas			
40-41 Prime White distillate	8½– 9	8½– 9	8½– 9
41-43 Prime White kerosene	8¾– 9½	8¾– 9½	8¾– 9¼
42-43 Water White kerosene	9 – 9¼	9 – 9¼	9 – 9½

NEUTRAL OILS

(Viscous)

Pennsylvania	Prices Nov. 22	Prices Nov. 15	Prices Oct. 25
200 Vis. No. 3 Assoc. Filt	26½–28	27 –28¾	31
180 Vis. No. 3 Assoc. Filt	23 –26	26 –27½	27½
150 Vis. No. 3 Assoc. Filt	21 –22½	23½–24	24
(Non-Viscous)			
34 350–360 Flash	12	12½	
36 Miners Neutrals, 300–305 Flash	11	11½	
Oklahoma (Vis. test 70)			
100 Vis. No. 2 Color	11 –11½	11 –11½	14 –15
200 Vis. No. 3 Color	22 –22½	22 –22½	23½–25
160 Vis. No. 4 Color	19½–20	19½–20	22 –22½
200 Vis. No. 4 Color	21 –21½	21 –21½	23 –24
200 Vis. No. 5 Color	20 –21	20 –21	22½–23½
South Texas (Vis. test 100; cold test 0)			
70 Vis. No. 2 Color Unfilt. Pale	15½–16½	16 –17	16 –17
100 Vis. No. 2 Color Unfilt. Pale	15¾–17	16¼–17¼	15 –17½
150 Vis. No. 2½ Color Unfilt. Pale	21 –22½	22 –22½	20 –23
200 Vis. No. 3 Color Unfilt. Pale	26 –29½	27 –29½	26 –30
300 Vis. No. 3 Color Unfilt. Pale	29½–34½	30¼–34	29½–34
500 Vis. No. 3½ Color Unfilt. Pale	41½–44½	40 –44½	40 –44½
750 Vis. No. 4 Color Unfilt. Pale	48 –52¾	50 –53¼	50 –53¼
70 Vis. No. 1½ Color Filt. Pale	26½	26½	26½
100 Vis. No. 1½ Color Filt. Pale	28½	28½	28½
150 Vis. No. 1½ Color Filt. Pale	32½	32½	32½
200 Vis. No. 2 Color Filt. Pale	37¾	37¾	37¾
300 Vis. No. 2 Color Filt. Pale	42¼	42¼	42¼
500 Vis. No. 2½ Color Filt. Pale	47¾	47¾	47¾
750 Vis. No. 2½ Color Filt. Pale	58	58	58
200 Vis. No. 5½ Color Red Oil	24½–25	26 –27¾	26 –27¾
300 Vis. No. 5½ Color Red Oil	28½–31	29½–32	30½–33
500 Vis. No. 6 Color Red Oil	35¾–38½	35¾–38½	36 –38½

CYLINDER STOCKS

Pennsylvania			
600 Steam Refined	29 –30	30 –32	32 –32½
635 Steam Refined	40 –41	40 –43	40 –41
650 Steam Refined	42½–43	43½–45	45 –45½
600 Flash	57	58	60
600 Amber Filtered	46 –48	49 –51	52 –52½
600 Medium Filtered (D)	60 –62	65	61 –62
Cold Test Stocks (bright filtered)	80 –85	80 –85	84 –85
Cold Test Stocks (dark filtered)	75 –76	75 –76	75
Black Oil	12 –12½	13	

WAX

Pennsylvania			
122-124 White Crude Scale Wax, N. Y., lb.	7½	7 – 7¼	7¾– 8
124-126 White Crude Scale Wax, N. Y., lb.	7¾	7¼– 7½	8¼
Oklahoma			
122-124 White Crude Scale Wax	7 – 7¼	7 – 7¼	7¼– 7½

FUEL OIL

Pennsylvania			
36-40 Fuel Oil	9	9 – 9½	10 –10½
Oklahoma			
32-36 Gas Oil (gal.)	5½– 6	5½– 6	6 – 6½
24-26 Fuel Oil (bbl.)	$2.00-$2.10	$1.90-$2.00	$2.15-$2.35
Fuel Oil, buyers' cars (bbl.)	$1.85-$1.90	$1.85-$1.90	$2.25-$2.35
North Texas			
32-36 Gas Oil (gal.)	6 – 6½	6 – 6½	6½– 7
24-26 Fuel, per bbl.	$2.00-$2.25	$2.25-$2.50	$2.25-$2.40
26-28 Fuel, per bbl.	$2.10-$2.35	$2.40-$2.60	$2.40-$2.60
South Texas Fuel	$2.75	$2.75	$2.75-$2.90

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KANSAS CITY OFFICE
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Telephone {Bell—Grand 1800 / Home—Main 8400}

(Continued from page 121)

lubs, as much of the lubricating oil in this territory comes from the general Ranger territory.

While gas oil has checked its downward flight, due to the large purchases made by the Standard Oil Company of Louisiana, the tank car congestion existing at north Baton Rouge, Louisiana, where the Standard has some thousand cars on siding, is expected to react on this product, and a slump is looked for in the near future.

Refiners in the Mid-Continent who have had some slight fuel oil relief from sources such as the recent purchase by the Standard of Indiana, are showing a disposition to store their heavier cuts in preference to taking the present market price, and as a result fuel oil is slightly stronger than this time a week ago.

Standard Of Kentucky Cuts Gasoline 1 Cent

The Standard Oil Company of Kentucky, effective November 22, reduced the tank wagon price of gasoline in its marketing territory embracing Kentucky, Georgia, Alabama, Mississippi, and Florida.

It also reduced the tank wagon price of kerosene half a cent a gallon at Jackson, Miss., Vicksburg, Miss., and Jacksonville, Fla., and 1 cent at Tampa, Fla.

Buyers Force Hand Of North Texas Refiner

Staff Special

HOUSTON, Nov. 22.—There is little change from a week ago in north Texas light oil markets, except that 58-60 gasoline shows recession a quarter cent, new navy specification has receded about a half cent, and fuel oil prices also have weakened.

Jobbers and buyers have been doing considerable visiting among refiners and marketers in the endeavor to establish permanent connections, which missionary trips instead of helping the market are having the opposite effect. Buyers are finding out that the refiner is in bad shape and are led to believe stuff can be purchased at their own price, especially when a small plant management that has to move its product finds itself unable to avoid light oil storage congestion.

Of course, if one refiner could slip out and quietly dispose of his product without his neighbor knowing all about it, he would be without doubt helping himself. But news travels rapidly, and as fast as a theoretical John Smith gets busy doing personal work among buyers a theoretical Bill Jones decides he canont afford to stay at home and let Smith get all the business, so he hops on a train and the first thing you know all the larger buyers have reception rooms overflowing with marketers and refiners attempting to sell products. It is not difficult to understand the effect of this situation on buyers.

Tank Wagon, Service Station Markets

Gasoline and Kerosene

BELOW are given in cents a gallon service station and tank wagon quotations on gasoline and tank wagon quotations for kerosene, as quoted by the Standard Oil Companies, the points at which prices are given being arranged by Standard Oil marketing districts. By tank wagon price is meant the price to reselling agents and not the price from the tank wagon to consumers.

	Gasoline Tank Wagon Nov. 22	Gasoline Service Station Nov. 22	Oil Tank Wagon Nov. 22
S. O. NEW JERSEY DISTRICT			
Atlantic City, N. J.	28.5	30.5	18.5
Newark, N. J.	28.5	30.5	18.5
Annapolis, Md.	29.5	31.5	19
Baltimore, Md.	28.5	30.5	18
Washington, D. C.	28.5	30.5	18.5
Danville, Va.	30	32	19.5
Norfolk, Va.	29	31	18.5
Petersburg, Va.	29.5	31.5	20
Richmond, Va.	29	31	18.5
Roanoke, Va.	30.5	32.5	20
Charleston, W. Va.	29.5	31.5	19
Keyser, W. Va.	30	32	19.5
Parkersburg, W. Va.	28.5	30.5	18
Wheeling, W. Va.	29.5	31.5	19
Charlotte, N. C.	30	31.5	20.5
Hickory, N. C.	30.5	32.5	21
Mt. Airy, N. C.	30.5	32.5	21
Salisbury, N. C.	30.5	32.5	21
Charleston, S. C.	28	30	19
Columbia, S. C.	30	32	20.5
S. O. NEW YORK DISTRICT			
New York, N. Y.	31	33	19
Albany, N. Y.	32	34	20
Buffalo, N. Y.	32	34	20
Syracuse, N. Y.	32	34	20
Boston, Mass.	32	34	20
Burlington, Vt.	32	34	20
Bridgeport, Conn.	32	34	20
Hartford, Conn.	32	34	20
New London, Conn.	32	34	20
Providence, R. I.	32	34	20
Augusta Me.	32	34	20
Portland, Me.	32	34	20

NOTE.—Atlantic Refining Company on September 2 advanced its price on gasoline at Providence, R. I., Hartford, Conn., New Haven, Conn., Worcester, Mass. and Springfield, Mass., making the service station price 35 cents and the tank wagon price 10 per cent less, or 31.5 cents. The increase was one cent on service station and, nine-tenths cent tank wagon.

ATLANTIC REFINING DISTRICT			
Pittsburgh, Pa.	30.6	34	20
Philadelphia, Pa.	30.6	34	20
Dover, Del.	30.6	34	20
Wilmington, Del.	30.6	34	20
S. O. OHIO DISTRICT			
Cleveland, Ohio.	30	31	21

NOTE—Tank wagon markets at all points in Ohio are the same as for Cleveland.

S. O. KENTUCKY DISTRICT			
Lexington, Ky.	28	30	20
Louisville, Ky.	26.5	28.5	19
Bowling Green, Ky.	28.5	29.5	20.5
Jackson, Miss.	27.5	29.5	18.5
Natchez, Miss.	27.5	29.5	19.5
Vicksburg, Miss.	27	29	18.5
Birmingham, Ala.	29	31	21
Mobile, Ala.	27	29	20
Atlanta, Ga.	29	31	20.5
Augusta, Ga.	29	31	20.5
Savannah, Ga.	29	31	20.5
Fort Myers, Fla.	29.5	31.5	21.5
Tampa, Fla.	28.5	30.5	19.5
S. O. LOUISIANA DISTRICT			
Camden, Ark.	28	31	22
Little Rock, Ark.	28	31	22
Baton Rouge, La.	24.5	27.5	17
New Orleans, La.	25.5	28.5	18
Shreveport, La.	26.5	29.5	19
Chattanooga, Tenn.	28.5	31.5	21
Nashville, Tenn.	27.5	30.5	20.5
Memphis, Tenn.	27	30	20

	Gasoline Tank Wagon Nov. 22	Gasoline Service Station Nov. 22	Oil Tank Wagon Nov. 22
MAGNOLIA PETROLEUM DISTRICT			
Muskogee, Okla.	30	32	21
Oklahoma City, Okla.	28	30	19
Tulsa, Okla.	28	30	20
Fort Smith, Ark.	28	30	21
Texarkana, Ark.	26	28	21
Amarillo, Texas.	28	30	22
Dallas, Texas.	26	28	21
El Paso, Texas.	27	28	22
Fort Worth, Texas.	26	28	21
Galveston, Texas.	26	28	21
Houston, Texas.	26	28	21
S. O. INDIANA DISTRICT			
Chicago, Ill.	27	29	18.5
East St. Louis, Ill.	28.3	29.3	18
Evansville, Ind.	28.9	29.9	19.4
Indianapolis, Ind.	28.3	29.3	19
Fort Wayne, Ind.	28.4	29.4	19.5
Bay City. Mich.	28.9	29.9	19.7
Detroit, Mich.	28.8	29.8	19.6
St. Louis, Mo.	26.2	28.5	19
Kansas City, Kans.	26.5	27.5	17.2
Topeka, Kans.	27.8	28.8	17.6
Wichita, Kans.	27.3	28.3	17.8
Des Moines, Ia.	28.5	29.5	19.5
Keokuk, Ia.	28.4	29.4	19.1
Sioux City, Ia.	28.5	29.5	19.3
La Crosse, Wis.	29	30	19.8
Milwaukee, Wis.	27.9	28.9	18.7
Madison, Wis.	28.1	29.1	18.9
Minneapolis, Minn.	28.2	30.2	20
Pipestone, Minn.	29.3	30.3	20
Aberdeen, S. D.	30.1	31.1	20.6
Sioux Falls, S. D.	30.1	31.1	20
Bismarck, N. D.	33.6	34.6	23.3
Fargo, N. D.	32	33	21.7
Grand Forks, N. D.	32.3	33.3	22
Minot, N. D.	34.4	35.4	24.1
Bartlesville, Okla.	27.3	28.3	17.7
S. O. NEBRASKA DISTRICT			
Crawford, Neb.	30	30	21
Omaha, Neb.	29.5	29.5	19.75
CONTINENTAL OIL DISTRICT			
Denver, Colo.	32	34	23
Glenwood Springs, Colo.	36	38	26.5
Pueblo, Colo.	32	34	23
Basin, Wyo.	29.5	31.5	20
Casper, Wyo.	28	30	18.5
Cody, Wyo.	31.5	33.5	22
Cheyenne, Wyo.	31.5	33.5	22
Lander, Wyo.	30.5	32.5	21
Billings, Mont.	31.5	33.5	22.5
Butte, Mont.	33.5	35.5	24.5
Great Falls, Mont.	33.5	35.5	24.5
Helena, Mont.	33.5	35.5	24.5
Miles City, Mont.	33.5	35.5	24.5
Ogden, Utah.	32	34	22.5
Salt Lake City, Utah.	32	34	22.5
Boise, Idaho.	34.5	36.5	25
Albuquerque, N. M.	33	35	23
S. O. CALIFORNIA DISTRICT			
Phoenix, Ariz.	35	35	23.5
Los Angeles, Cal.	27	27	16.5
Fresno, Cal.	28	28	19
San Francisco, Cal.	27	27	16.5
Reno, Nev.	35	35	26.5
Portland, Ore.	29	29	17.5
Seattle, Wash.	28	28	17.5
Spokane, Wash.	32	32	23.5
Tacoma, Wash.	28	28	17.5

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Titusville, Pennsylvania

Keystone Opens New Quarters For Offices

CHICAGO, Nov. 20.—Keystone Oil & Manufacturing Company, of Chicago, in order to procure more spacious quarters, recently has moved its headquarters from the sixth to the fourth floor in the building at 111 North Market street. The sales department, under the supervision of W. C. Pearl, has been divided into three divisions, Mr. Pearl remaining sales manager.

R. T. Wallace, who, until recently, was in the Cleveland, Ohio, office, 521 Union building, has been promoted to head of the fuel and gas oil department. He has already taken up his duties in Chicago and has been succeeded in Cleveland by O. L. Baldwin, who comes from Chicago, and incidentally is a brother to G. E. Baldwin, manager of the Cleveland office.

T. F. Thompson, for five years the Chicago manager of the J. F. Campion Company, is now the head of the light oil department of the Keystone. The department of lubricating oil is headed by Kenneth Huszagh, famous as a swimmer and possibly better known among athletes than in the oil industry.

The recent establishment of a branch office in Columbus, South Carolina, headed by W. H. Patterson, and the announcement that a New York office will be opened before the first of January, show the rapid expansion of the Keystone Oil & Manufacturing Company.

E. W. Wagy Succeeds Ambrose At Bartlesville

Earl W. Wagy, petroleum engineer of the Bureau of Mines, Washington, will succeed A. W. Ambrose as superintendent of the Petroleum Experiment Station at Bartlesville, Oklahoma. Mr. Ambrose recently succeeded J. O. Lewis as chief of the petroleum division.

Mr. Wagy is a graduate of the State University of California, College of Mines. After graduation he went with the oil department of the Southern Pacific Railway, operating in the California fields. His work with this company was practical, including drilling and superintendence. After he entered the services of the Bureau of Mines Mr. Wagy took up work in which the bureau was cooperating with the U. S. Land Office in connection with government leased lands in California. He also acted in an advisory capacity for the U. S. Fuel Administration, handling technical problems and inspecting power plants, looking toward conservation of fuel.

Mr. Wagy wrote technical paper No. 247, published by the bureau, on "Perforated Casing and Screen Pipe in Oil Wells," which is of practical value to oil operators in regulating the flow of sand into wells in formations which need to be cased in order to prevent caving.

For the last year and a half he has acted as assistant to the chief of the division, in Washington, in administering the affairs of the petroleum division.

Crude Production, Consumption and Stocks

As Reported by U. S. Geological Survey

THE column headed Production shows the quantity of oil received from producers by pipe line and other marketing companies and by refineries that receive the crude directly from the well. Figures as to oil consumed on leases and producers' stocks are not included except for California, which include all petroleum brought to the surface.

The column headed Delivered to Consumers includes figures on domestic crude petroleum delivered to consumers by pipe lines and other marketing companies.

Stocks include domestic crude held in storage on the last day of the month by pipe lines and other marketing companies. Crude oil delivered to refiners is not included nor is petroleum held in storage by producers on leases. Figures are in barrels of 42 gallons.

Field	Production	Delivered to Consumers	Stocks	
APPALACHIAN				
Total, 1919	29,232,000	28,922,000	Dec. 31,	4,014,000
June, 1920	2,658,000	2,696,000	June 30,	4,083,000
July, 1920	2,613,000	2,799,000	July 31,	3,922,000
Aug., 1920	2,649,000	2,641,000	Aug. 31,	3,930,000
Sept. 1920	2,601,000	2,789,000	Sept. 30,	3,750,000
LIMA-INDIANA				
Total, 1919	3,444,000	3,442,000	Dec. 31,	1,153,000
June, 1920	271,000	219,000	June 30,	1,355,000
July, 1920	275,000	191,000	July 31,	1,439,000
Aug., 1920	266,000	158,000	Aug. 31,	1,547,000
Sept. 1920	273,000	245,000	Sept. 30,	1,575,000
ILLINOIS				
Total, 1919	12,436,000	10,165,000	Dec. 31,	4,471,000
June, 1920	931,000	1,064,000	June 30,	3,578,000
July, 1920	925,000	1,099,000	July 31,	3,404,000
Aug., 1920	924,000	1,091,000	Aug. 31,	3,237,000
Sept. 1920	903,000	839,000	Sept. 30,	3,301,000
ALL MID-CONTINENT (Okla., Kans., Central and North Texas, North La.)				
Total, 1919	196,891,000	198,901,000	Dec. 31,	78,037,000
June, 1920	21,484,000	17,782,000	June 30,	82,653,000
July, 1920	22,124,000	19,184,000	July 31,	85,681,000
Aug., 1920	22,357,000	20,765,000	Aug. 31,	87,273,000
Sept. 1920	21,076,000	21,081,000	Sept. 30,	87,290,000

Oklahoma-Kansas	Production	Central North Texas	Production
June, 1920	12,592,000	June, 1920	5,776,000
July, 1920	12,919,000	July, 1920	5,912,000
Aug., 1920	13,089,000	Aug., 1920	5,894,000
Sept. 1920	12,713,000	Sept. 1920	5,766,000

North Louisiana	Production
June, 1920	3,116,000
July, 1920	3,293,000
Aug., 1920	3,374,000
Sept. 1920	2,597,000

GULF COAST	Production	Delivered to Consumers	Stocks	
Total, 1919	20,568,000	17,417,000	Dec. 31,	11,389,000
June, 1920	2,042,000	2,453,000	June 30,	10,722,000
July, 1920	2,296,000	2,640,000	July 31,	10,377,000
Aug., 1920	2,408,000	2,173,000	Aug., 31,	10,612,000
Sept. 1920	2,245,000	2,152,000	Sept. 30	10,719,000
ROCKY MOUNTAIN				
Total, 1919	20,568,000	17,417,000	Dec. 31,	*811,000
June, 1920	1,643,000	1,637,000	June 30,	223,000
July, 1920	1,603,000	1,598,000	July 31,	228,000
Aug., 1920	1,543,000	1,520,000	Aug. 31,	251,000
Sept. 1920	1,619,000	1,600,000	Sept. 31,	270,000
CALIFORNIA				
Total, 1919	101,564,000	103,016,000	Dec. 31,	29,142,000
May, 1920	8,636,000	9,155,000	May 31,	25,253,000
June, 1920	8,190,000	9,383,000	June 30,	24,060,000
July, 1920	8,583,000	9,526,000	July 31,	23,117,000
Aug., 1920	8,997,000	9,965,000	Aug. 31	22,140,000
Sept. 1920	9,128,000	9,403,000	Sept. 30,	21,874,000

*Including crude stocks held by refiner

Tampico Congestion Is Worst In History

By Special Correspondent

TAMPICO, MEXICO, Nov. 20. — At a meeting held here last week steamship Agents representing the Ward Line, Bowie Line and several companies represented by Pulford Brothers, agreed to suggest to their principals that they place an embargo on the port of Tampico or increase the freight rates 100 per cent. Their reason for this action is to give the Tampico merchants, supply houses and oil companies an opportunity not only to clear the fiscal wharf and the custom house of accumulated freight, but also the terminals up and down the river, where the congestion is said to be the worst in the history of the country.

The steamship men blame the present congestion on the importers, saying that they will not take their shipments off the wharves as soon as it arrives.

According to E. W. Rowley, head of a local stevedoring firm, there are 29 vessels in port with 55,000 tons of cargo, more than can be unloaded in 60 days with the present facilities.

Expect Little Upturn Before January First

Little sign that the bottom of the market has been reached was visible to most of the western Pennsylvania refiners during the past week. Some of them reported that inquiries on fuel oil were coming in in considerable volume and some of them said good amounts of fuel oil moved from their plants. However, the price of fuel oil eased off from a quarter to half a cent from the price of a week ago.

Most of them believe that the course of prices generally will not show much of an upward turn until the first of the year at least, and some believe that prices will go still lower before the turn for the better comes.

Kerosene held its own fairly well, altho the export trade is reported as dead for the time being, with little to indicate any early improvement in shipments overseas.

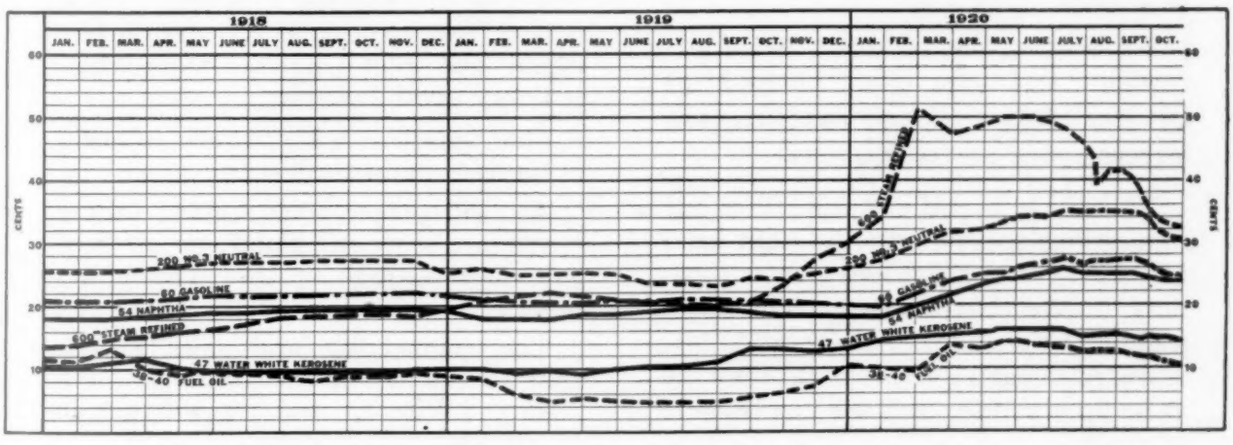
The discovery of petroleum in the eastern part of San Salvador is reported by Dr. Eerich, a geologist.

Export Shipments From Gulf Ports

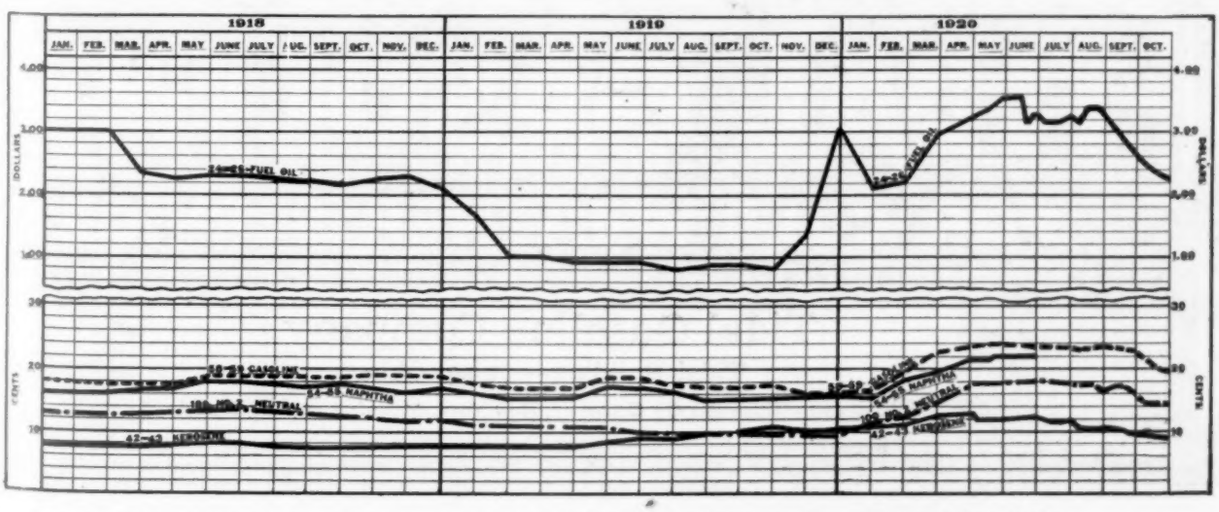
Staff Special

HOUSTON, Nov. 22—The New Orleans Refining Company loaded a cargo of export kerosene on the steamship "Gold Leaf," at Good Hope, its only shipment from a Louisiana gulf port station in November. Export Oil Corporation loaded 1,081,423 gallons of fuel for England on steamship "Eduardo," and 49,000 tons of gasoline for France on steamship "Luciline." Mexican Petroleum Corporation loaded 2,469,043 gallons of gasoline for France on steamship "Ranella," and the steamship "Spaulding" was loaded with 63,616 barrels of fuel for a port in Argentine Republic. Movement of kerosene from the Mid-Continent and north Texas to Standard, at Baton Rouge, continues heavy and authentic information is will continue at least two months, if not longer. Eighteen cargoes of Mexican crude were unloaded at Louisiana Gulf ports the first half of November, totaling nearly 900,000 barrels.

Refinery Prices at Pennsylvania Plants Through October 1920



Prices at Oklahoma Plants Through October 1920



*Quotation of 54-55 Naphtha is discontinued because little is available due to the deeper gasoline cut being made by refineries.

Oil Marketers—

Let us help increase your s

Send for this folder, "Data on Winter Gasoline." It describes what it should be, its tests and how to make them and its action in the motor.

This folder is an accurate—tho brief—survey of the motor fuel situation directed especially to aid the marketer in planning a special campaign to *increase* his winter sales of gasoline.

We will back this up with the personal advice of one of our engineers, who will be glad to call on you at your invitation.

We believe that a proper use of advertising and sales effort *backed up by the right kind of gasoline* will increase your winter business.

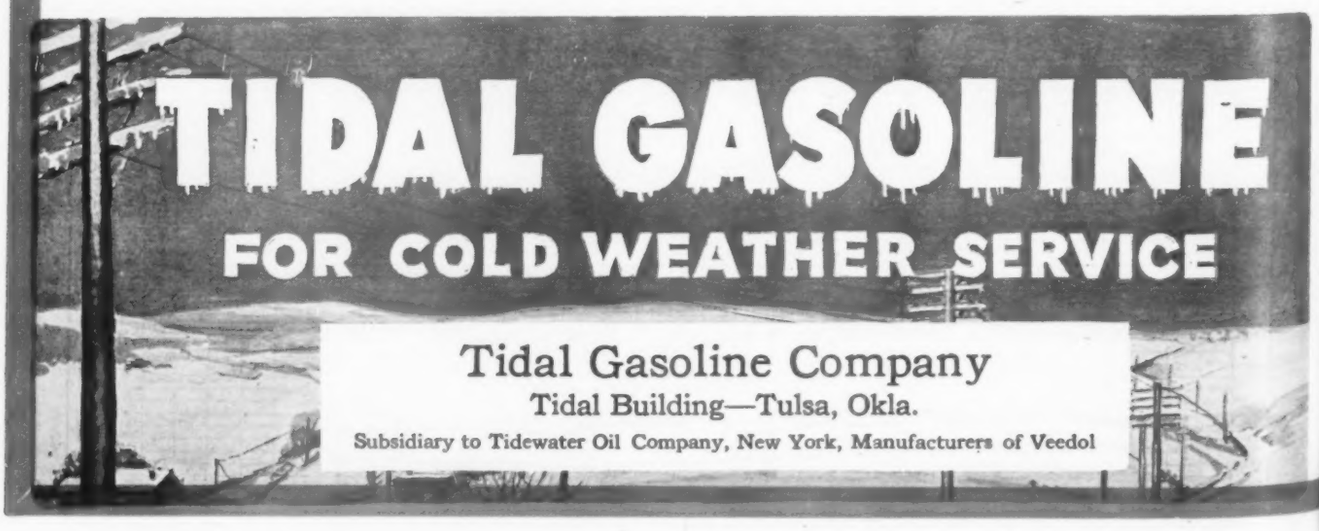
We believe that if you will follow our suggestions and put out the right kind of goods, you will achieve greater business despite cold weather. The automobile owners have millions of dollars invested in cars. Why should they lay them up or reduce their use just because it's cold?

We have spent considerable time and taken great pains in establishing refineries wherein we make a **REAL WINTER GASOLINE**, full of snap, yet vigorous and free from carbon—the kind of a gasoline that you can guarantee to your hot weather customers will give them entire satisfaction in cold weather—the kind of a gasoline whose extra quality will warrant you in charging a premium of a cent or two a gallon if you desire, but which will cost you no more than ordinary good gasoline.

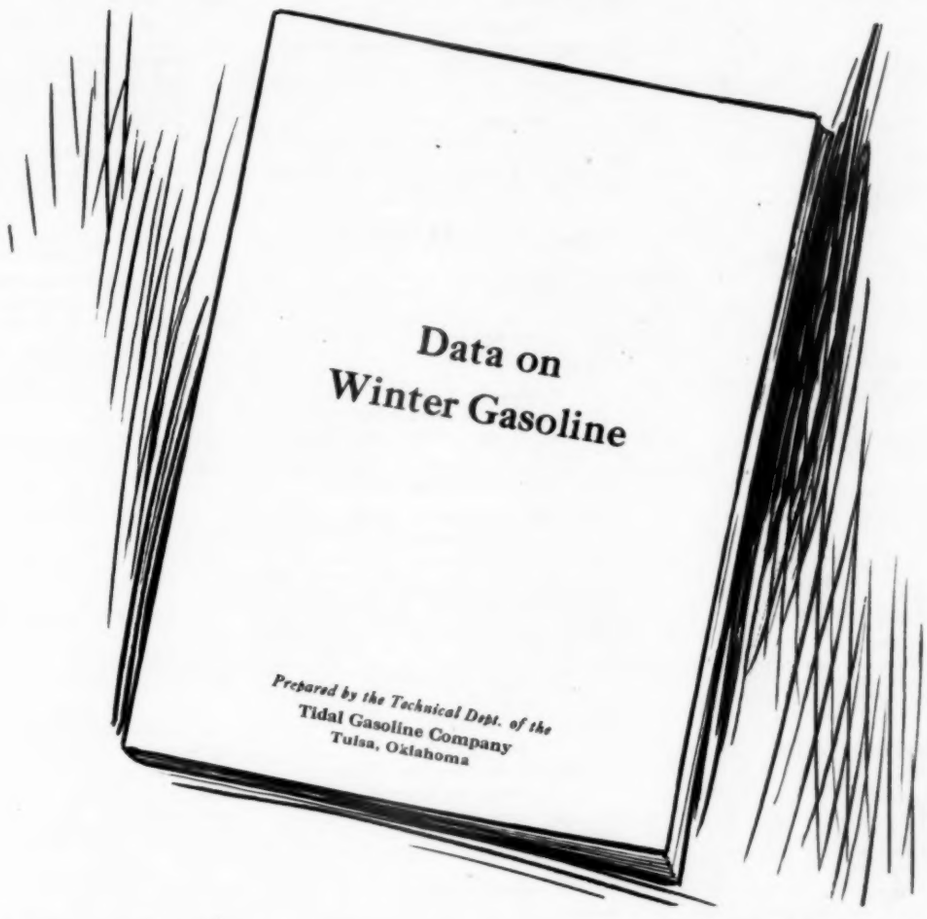
That gasoline we are now offering in limited quantities.

We will protect our regular winter customers by an equal or greater gallonage throughout the summer demand.

The engineering and sales service that backs it up is yours for the asking. Wire us and we will get in touch with you at once.


TIDAL GASOLINE
FOR COLD WEATHER SERVICE
Tidal Gasoline Company
Tidal Building—Tulsa, Okla.
Subsidiary to Tidewater Oil Company, New York, Manufacturers of Veedol

ur sales of WINTER GASOLINE



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TELEGRAM

Collect—Fast Message

TIDAL GASOLINE CO.
TULSA, OKLA.

SEND ME DATA ON YOUR WINTER GASOLINE.

SIGNED.....

Crude Oil Quotations From All Fields

Price Changes From September 1, 1919, To Date

EASTERN FIELDS

JOSEPH SEEP AGENCY
SOUTH PENN OIL CO.

Pennsylvania—$6.10

1919—Price Sept. 1, $4.00—Adv. 25¢ Sept. 2—Adv. 25¢ Nov. 7—Adv. 25¢ Dec. 22—Adv. 25¢ Dec. 31.
1920—Price Jan. 1, $5.00—Adv. 25¢ Jan. 26—Adv. 25¢ Feb. 5—Adv. 15c Feb. 17—Adv. 15¢ Feb. 27—Adv. 15¢ Mar. 1—Adv. 15¢ Mar 2.

Cabell—$4.46

1919—Price Sept. 1, $2.77—Adv. 10¢ Sept. 2—Adv. 15¢ Nov. 7—Adv. 25¢ Dec. 22—Adv. 25¢ Dec. 31.
1920—Price Jan. 1, $3.42—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 2—Adv. 25¢ May 10—Adv. 29¢ Oct. 11.

Corning—$4.25

1919—Price Sept. 1, $2.85—Adv. 10¢ Sept. 2—Adv. 15¢ Nov. 7—Adv. 25¢ Dec. 22—Adv. 15¢ Dec. 31.
1920—Price Jan. 1, $3.50—Adv. 15¢ Mar. 4—Adv. 10¢ Mar. 19—Adv. 25¢ Mar. 30—Adv. 25¢ May 15.

Somerset—$4.25

1919—Price Sept. 1, $2.60—Adv. 10¢ Sept. 2—Adv. 15¢ Nov. 7—Adv. 25¢ Dec, 22—Adv. 15¢ Dec. 31.
1920—Price Jan. 1 $3.25—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 2—Adv. 25¢ May 10—Adv. 25¢ Sept. 23.

Somerset Light (38° and Up)—$4.50

1919—Price Sept. 1, $2.60—Adv. 10¢ Sept. 2—Adv. 15¢ Nov. 7—Adv. 25¢ Dec 22—Adv. 15¢ Dec. 31.
1920—Price Jan. 1, $3.25—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 2—Adv. 25¢ May 10—Adv. 25¢ Sept. 23—Adv. 25¢ Oct. 11. Somerset Light Crude purchased as such beginning Oct. 11.

Ragland—$2.60

1919—Price Sept. 1, $1.25—Adv. 10¢ Nov. 7—Adv. 25¢ Dec. 22—Adv. 15¢ Dec. 31.
1920—Price Jan. 1, $1.75—Adv. 35¢ May 10—Adv. 25¢ July 20—Adv. 25¢ Sept. 23.

CENTRAL STATES FIELDS

OHIO OIL CO.

Wooster—$4.05

1919—Price Sept. 1, $2.85—Adv. 10¢ Sept. 5—Adv. 25¢ Nov. 21—Adv. 25¢ Dec. 22.
1920—Price Jan. 1, $3.45—Adv. 25¢ Jan. 12—Adv. 10¢ Mar. 1—Adv. 25¢ Mar. 10.

Lima—$3.73

1919—Price Sept. 1, $2.38—Adv. 10¢ Sept. 8—Adv. 25¢ Nov. 21—Adv. 25¢ Dec 22.
1920—Price Jan. 1, $2.98—Adv. 25¢ Jan. 12—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 10.

Indiana—$3.63

1919—Price Sept. 1, $2.28—Adv. 10¢ Sept. 8—Adv. 25¢ Nov. 21—Adv. 25¢ Dec. 22.
1920—Price Jan. 1, $2.88—Adv. 25¢ Jan. 12—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 10.

Princeton—$3.77

1919—Price Sept. 1, $2.42—Adv. 10¢ Sept. 8—Adv. 25¢ Nov. 21—Adv. 25¢ Dec. 22.
1920—Price Jan. 1, $3.02—Adv. 25¢ Jan. 12—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 10.

Illinois—$3.77

1919—Price Sept. 1, $2.42—Adv. 10¢ Sept. 8—Adv. 25¢ Nov. 21—Adv. 25¢ Dec. 22.
1920—Price Jan. 1, $3.02—Adv. 25¢ Jan. 12—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 10.

Plymouth—$3.48

1919—Price Sept. 1, $2.33—Adv. 20¢ Nov. 21—Adv. 25¢ Dec. 22.
1920—Price Jan. 1, $2.78—Adv. 25¢ Jan. 7—Adv. 20¢ Mar. 1—Adv. 25¢ Mar. 3.

MID-CONTINENT FIELDS

PRAIRIE OIL & GAS CO.
GULF PIPE LINE CO.
THE TEXAS CO.
MAGNOLIA PETROLEUM CO.
SINCLAIR OIL & REFINING CORP.
COSDEN & COMPANY
SUN COMPANY

Kansas—$3.50

(Price posted by Prairie and Gulf)

1919—Price Sept. 1, $2.25—Adv. 25¢ Nov. 19—Adv. 25¢ Dec. 20.
1920—Price Jan. 1, $2.75—Adv. 25¢ Jan. 6—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 1.

Oklahoma Light Crudes—$3.50

(All Old Fields)

1919—Price Sept. 1, $2.25—Adv. 25¢ Nov. 19 by Prairie and Gulf, Nov. 20, by Sinclair and Cosden, by Magnolia Nov. 21—Adv. 25¢ Dec. 20 by Prairie, Gulf, Texas, Sinclair and Cosden, by Magnolia Dec. 22. The Texas Company was paying $2.50 for Cushing crude prior to Sept. 1.
1920—Price Jan. 1, $2.75—Adv. 25¢ Jan. 5, by Sinclair and Cosden, by Prairie, Gulf and Texas, Jan. 6; by Magnolia, Jan. 8.—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 1.

Hewitt—$3.50

Duncan and Comanche—$3.50

(Price posted by Magnolia)

1919—Price Dec. 19, $1.85—Adv. 15¢ Dec. 22.
1920—Price Jan. 1, $2.00—Adv. 25¢ Jan. 8—Adv. 75¢ Jan. 29—Adv. 25¢ Feb. 27—Adv. 25¢ Apr. 8.

Healdton—$2.75

(Price posted by Texas and Magnolia)

1919—Price Sept. 1, $1.20—Adv. 15¢ Nov. 21—Adv. 50¢ Dec. 19 by Magnolia, by Texas Dec. 20—Adv. 15¢ Dec. 20 by Texas, by Magnolia Dec. 22.
1920—Price Jan. 1, $2.00—Adv. 25¢ Jan. 6 by Texas, by Magnolia Jan. 8—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 1 by Texas, by Magnolia Mar. 3.

NORTH TEXAS FIELDS

PRAIRIE OIL & GAS CO.
THE TEXAS COMPANY
GULF PIPE LINE CO.
MAGNOLIA PETROLEUM CO..

Electra and Burkburnett—$3.50

1919—Price Sept. 1 $2.25—Adv. 25¢ Nov. 20—by Texas and Gulf, by Magnolia Dec. 18—Adv. 25¢ Dec. 20 by Texas and Gulf, by Magnolia Dec. 23.
1920—Price Jan. 1, $2.75—Adv. 25¢ Jan. 6—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 1.

Ranger—$3.50

1919—Price Sept. 1, $2.25—Adv. 25¢ Nov. 19 by Prairie, by Texas and Gulf Nov. 20, by Magnolia Dec. 18—Adv. 25¢ Dec. 20 by Prairie, Texas and Gulf, by Magnolia Dec. 23.
1920—Price Jan. 1, $2.75—Adv. 25¢ Jan. 6—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 1.

Strawn and Moran—$3.50

(Price Posted by Magnolia)

1919—Price Sept. 1, $2.25—Adv. 25¢ Dec. 18—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.75—Adv. 25¢ Jan. 6—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 1.

Corsicana Light—$3.00

(Price Posted by Magnolia)

1919—Price Sept. 1, $2.25—Adv. 25¢ Dec. 18—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.75—Adv. 25¢ Mar. 1.

Corsicana Heavy—$1.75

(Price Posted by Magnolia)

1919—Price Sept. 1, $1.05—Adv. 10¢ Nov. 21—Adv. 15¢ Dec. 23.
1920—Price Jan. 1, $1.30—Adv. 25¢ Jan. 6—Adv. 20¢ Mar. 1.

NORTH LOUISIANA FIELDS

STANDARD OIL CO. OF LA.
GULF REFINING CO.
THE TEXAS COMPANY.

Caddo Light—$3.50

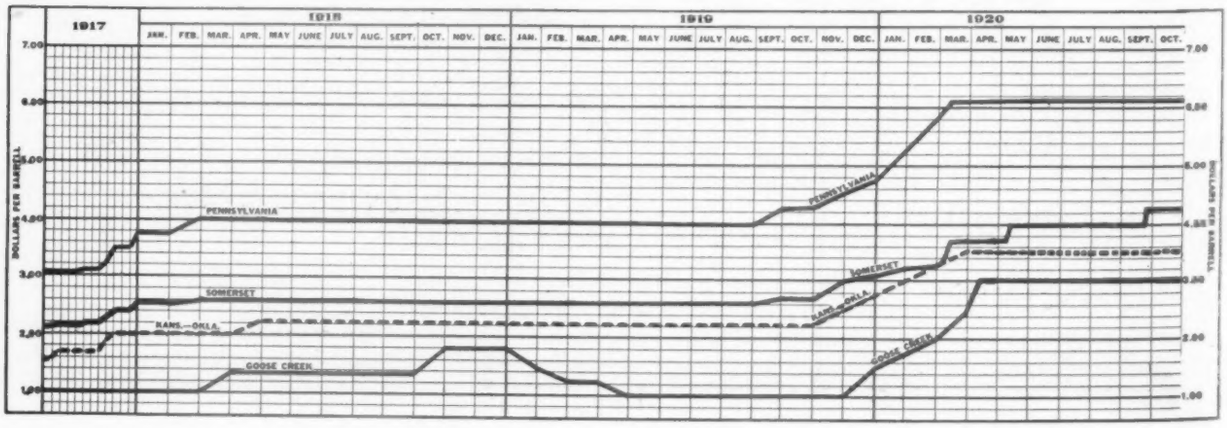
Note—Standard Oil Company grades Caddo Light crude according to gravity, viz.; 38 degrees and above, 35 to 37.9, and 32 to 34.9. A price differential is maintained, of 10 cents between the high and medium grades and 15 cents between the high and low grades. Prices and changes quoted here are on Standard's highest grade. They agree with prices paid for all Caddo Light oil by other purchasing agencies.

1919—Price Sept. 1, $2.25—Adv. 25¢ Dec. 3—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.75—Adv. 25¢ Jan. 7 by Gulf and Texas, by Standard Jan. 8—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 15.

Caddo Heavy—$2.50

1919—Price Sept. 1, 75 cents—Adv. 25¢ Dec. 3—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $1.25—Adv. 25¢ Jan. 7 by Texas and Gulf, by Standard Jan. 8—Av. 25¢

Price Trend of Principal Crudes Through October 1920



Feb. 27 by Texas and Gulf, by Standard Feb. 28—Adv. 25¢ Feb. 28 by Texas and Gulf, by Standard Mar. 15—Adv. 25¢ May 3—Adv. 25¢ May 10.

Desoto—$3.40

1919—Price Sept. 1, $2.15—Adv. 25¢ Dec. 3—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.65—Adv. 25¢ Jan. 7 by Texas and Gulf, by Standard Jan. 8—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 15.

Crichton—$3.00

1919—Price Sept. 1, $1.75—Adv. 25¢ Dec. 3—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.25—Adv. 25¢ Jan. 7 by Texas and Gulf, by Standard Jan. 8—Adv. 25¢ Feb. 27 by Texas and Gulf, by Standard Feb. 28—Adv. 25¢ Mar. 15.

Homer Light—$3.25

Note—Price of Homer Light crude is posted by Standard of La., which company buys according to gravity, viz.; 37 degrees and above, 35 to 36.9, and 32 to 34.9. A price differential is maintained, of 10 cents between the high and medium grades and 15 cents between the high and low grades. The first quotation of Homer crude was $2.15 posted May 2, 1919. Prior to June 1920 the first two grades of Homer crude were quoted on the basis of 38 degrees and above ,and 35 to 37.9 degrees respectively.

1919—Price Sept. 1, $2.25—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.50—Adv. 25¢ Jan. 8—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 15.

Homer Heavy (Below 32°)—$1.75

(Price Posted by Standard)

1919—Price Sept. 1, $1.00—Adv. 25¢ Dec. 18—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $1.50—Adv. 25¢ Jan. 6.

Bull Bayou Light—$3.15

Note—Standard Oil Company of La., grades Bull Bayou light crude according to gravity— viz.;38 degrees and above, 35 to 37.9 and 32 to 34.9, and maintains a price differential of 10 cents between the high and medium grades and 15 cents between the high and low grades. Prices and changes quoted here are on the highest grade.

1919—Price Sept. 1, $1.90—Adv. 25¢ Dec. 3—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.40—Adv. 25¢ Jan. 8—Adv. 25¢ Feb. 27—Adv. 25¢ Mar. 15.

Bull Bayou Heavy (Below 32°)—$2.00

(Price Posted by Standard)

1919—Price Sept. 1, 75 cents—Adv. 25¢ Dec. 3—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $1.25—Adv. 25¢ Jan. 8—Adv. 25¢ Feb. 27—Adv. 25¢ Feb. 28.

GULF COASTAL FIELDS

GULF PIPE LINE CO.
SUN PIPE LINE CO.
THE TEXAS COMPANY
HUMBLE OIL & REFINING CO.

Spindletop—$3.00

(Price Posted by Gulf and Sun)

1919—Price Sept. 1, $1.00—Adv. 25¢ Dec. 5—Adv. 25¢ Dec. 20.
1920—Price Jan. 1, $1.50—Adv. 25¢ Jan. 6—Adv. 25¢ Feb. 19 by Gulf, by Sun Feb. 20—Adv. 25¢ Mar. 2—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

Goose Creek—$3.00

1919—Price Sept. 1, $1.00—Adv. 25¢ Dec. 5—Adv. 25¢ Dec. 20.
1920—Price Jan. 1, $1.50—Adv. 25¢ Jan. 6—Adv. 25¢ Feb. 18 by Humble, by Gulf Feb. 19, by Texas Feb. 20—Adv. 25¢ Mar. 2 by Humble, and Gulf, by Texas Mar. 3—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

Sour Lake—$3.00

1919—Price Sept. 1, $1.00—Adv. 25¢ Dec. 5—Adv. 25¢ Dec. 20.
1920—Price Jan. 1, $1.50—Adv. 25¢ Jan. 6—Adv. 25¢ Feb. 19 by Gulf, by Sun and Texas Feb. 20—Adv. 25¢ Mar. 2 by Gulf and Sun, by Texas Mar. 3—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

Humble—$3.00

1919—Price Sept. 1, $1.00—Adv. 25¢ Dec. 5—Adv. 25¢ Dec. 20.
1920—Price Jan. 1, $1.50—Adv. 25¢ Feb. 18 by Humble, by Gulf Feb. 19, by Sun and Texas Feb. 20—Adv. 25¢ Mar. 2 by Humble, Gulf and Sun, by Texas Mar. 3—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

Batson—$3.00

(Price Posted by Sun and Gulf)

1919—Price Sept. 1, $1.00—Adv. 25¢ Dec. 5—Adv 25¢ Dec. 20.
1920—Price Jan. 1, $1.50—Adv. 25¢ Feb. 19 by Gulf by Sun Feb. 20—Adv. 25¢ Mar. 2—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

Hull—$3.00

(Price posted by Humble)

1920—Price Feb. 18, $2.00—Adv. 25¢ Mar. 2—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

West Columbia—$3.00

(Price Posted by Texas)

1919—Price Sept. 1, 75 cents—Adv. 25¢ Dec. 5—Adv. 50¢ Dec. 20.
1920—Price Jan. 1, $1.50—Adv. 50¢ Feb. 20—Adv. 25¢ Mar. 3—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

Edgerly—$3.00

(Price Posted by Gulf)

1919—Price Sept. 1, $1.00—Adv. 25¢ Dec. 5—Adv. 25¢ Dec. 20.
1920—Price Jan. 1, $1.50—Adv. 25¢ Jan. 6—Adv. 25¢ Feb. 19—Adv. 25¢ Mar. 2—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

Vinton and Jennings—$3.00

(Price Posted by Gulf and Texas)

1919—Price Sept. 1, $1.00—Adv. 25¢ Dec. 5—Adv. 25¢ Dec. 20.
1920—Price Jan. 1, $1.50—Adv. 25¢ Jan. 6—Adv. 25¢ Feb. 19 by Gulf, by Texas Feb. 20—Adv. 25¢ Mar. 2 by Gulf, by Texas Mar. 3—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

Dayton and Saratoga—$3.00

(Price Posted by Sun)

1919—Price Sept. 1, $1.00—Adv. 25¢ Dec. 5—Adv. 25¢ Dec. 20.
1920—Price Jan. 1, $1.50—Adv. 25¢ Jan. 6—Adv. 25¢ Feb. 20—Adv. 25¢ Mar. 2—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

Markham—$3.00

(Price Posted by Texas)

1919—Price Sept. 1, $1.00—Adv. 25¢ Dec. 5—Adv. 25¢ Dec. 20.
1920—Price Jan. 1, $1.50—Adv. 25¢ Feb. 20—Adv. 25¢ Mar. 3—Adv. 25¢ Mar. 4—Adv. 50¢ Apr. 13.

WYOMING FIELDS

OHIO OIL CO.
MIDWEST REFINING CO.

Elk Basin—$3.10

(Price Posted by Ohio Oil Co.)

1919—Price Sept. 1, $1.85 — Adv. 25¢ Nov.21—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.35—Adv. 25¢ Jan. 13—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 16.

Grass Creek—$3.10

(Price Posted by Ohio Oil Co.)

1919—Price Sept. 1, $1.85—Adv. 25¢ Nov. 21—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.35—Adv. 25¢ Jan. 13—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 16.

Big Muddy—$2.75

(Price Posted by Ohio Oil Co.)

1919—Price Sept. 1, $1.50—Adv. 25¢ Nov. 21—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.00—Adv. 25¢ Jan. 13—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 16.

Lance Creek—$3.05

(Price Posted by Ohio Oil Co.)

1919—Price Sept. 1, $1.80—Adv. 25¢ Nov. 21—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.30—Adv. 25¢ Jan. 13—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 16.

Rock Creek—$2.75

(Price Posted by Ohio Oil Co.)

1919—Price Sept. 1, $1.50—Adv. 25¢ Nov. 21—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.00—Adv. 25¢ Jan. 13—Adv. 10¢ Feb. 3—Adv. 15¢ Mar. 1—Adv. 25¢ Mar. 16.

Salt Creek—$2.75

(Price Posted by Midwest)

1919—Price Sept. 1, $1.50—Adv. 25¢ Nov. 21—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $2.00—Adv. 25¢ Jan. 13—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 16.

Lander Heavy—$2.00

(Price Posted by Midwest)

1920—Price Jan. 1, $1.25—Adv. 50¢ Jan. 13—Adv. 25¢ Mar. 16.

CANADIAN FIELDS

IMPERIAL OIL CO. LTD.

Petrolia—$4.13

1919—Price Sept. 1, $2.78—Adv. 10¢ Sept. 8—Adv. 25¢ Nov. 21—Adv. 25¢ Dec. 23.
1920—Price Jan. 1, $3.38—Adv. 25¢ Jan. 13—Adv. 25¢ Mar. 1—Adv. 25¢ Mar. 10.

Crude Oil Prices

EASTERN FIELDS

	Nov. 22 1920	Jan. 1 1920	Jan. 1 1919
Pennsylvania	$6.10	$5.00	$4.00
Cabell	4.46	3.42	2.77
Corning	4.25	3.50	2.85
Somerset, light	4.50	3.25	2.60
Somerset	4.25	3.25	2.60
Ragland	2.60	1.75	1.25
McKinney	2.60	....	....

CENTRAL STATES FIELDS

Wooster	4.05	3.45	2.58
Lima	3.73	2.98	2.38
Indiana	3.63	2.88	2.28
Princeton	3.77	3.02	2.42
Lodi	4.00	2.98	....
Illinois	3.77	3.02	2.42
Plymouth	3.48	2.78	2.33
Canadian Petrolia	4.13	3.38	2.78
Western Kentucky	3.93	2.93	....

MID-CONTINENT FIELDS

Kansas-Okla	3.50	2.75	2.25
Hewitt	3.50	....	....
Duncan and Comanche	3.50	2.00	....
Healdton	2.75	2.00	1.45

NORTH TEXAS FIELDS

Burkburnett	3.50	2.75	....
Electra	3.50	2.75	2.25
Corsicana, light	3.00	2.75	2.25
Corsicana, heavy	1.75	1.30	1.05
Ranger	3.50	2.75	2.25
Strawn	3.50	2.75	2.25
Moran	3.50	2.75	2.25

NORTH LOUISIANA FIELDS

Caddo above 38	3.50	2.75	2.25
Caddo 35 to 37.9	3.40	2.65	2.15
Caddo 32 to 34.9	3.35	2.60	2.10
Caddo, heavy	2.50	1.25	1.25
De Soto	3.40	2.65	2.15
Homer	3.25	2.50	....
Bull Bayou	3.15	2.40	....
Crichton	3.00	2.25	1.75

GULF COASTAL FIELDS

Spindletop	3.00	1.50	1.80
Goose Creek	3.00	1.50	1.80
Sour Lake	3.00	1.50	1.80
Humble	3.00	1.50	1.80
Batson	3.00	1.50	1.80
Hull	3.00	....	....
West Columbia	3.00	1.50	....
Edgerly	3.00	1.50	....
Vinton	3.00	1.50	....
Jennings	3.00	1.50	....
Dayton	3.00	1.50	1.80
Saratoga	3.00	1.50	1.80
Markham	3.00	1.50	....

WYOMING FIELDS

Elk Basin	3.10	2.35	1.85
Grass Creek	3.10	2.35	1.85
Big Muddy	2.75	2.00	1.50
Salt Creek	2.75	2.00	1.50
Lance Creek	3.05	2.30	....
Rock Creek	2.75	2.00	....
Osage	3.05	....	....
Lander	2.00	1.25	....
Wyoming Black	1.75	....	....

CALIFORNIA

Effective January 30, the Standard Oil Company offered a new price schedule for crude at the well, the new schedule varying widely from the old one in effect since June 10, 1919, and advancing prices for higher gravity crudes very materially over the old figures, and to new record high levels for the California fields.

Effective March 17 the Standard of California advanced all grades in oil fields 25 cents a barrel over prices announced Jan. 30. Effective July 10 the Standard advanced all grades in all fields 12 cents a barrel. Prices Nov. 22 are as follows:

SAN JOAQUIN VALLEY AND WHITTIER-FULLERTON FIELDS

Degrees	Price	Degrees	Price
14-17.9	$1.60	27-27.9	$2.15
18-18.9	1.61	28-28.9	2.25
19-19.9	1.63	29-29.9	2.35
20-20.9	1.66	30-30.9	2.45
21-21.9	1.70	31-31.9	2.55
22-22.9	1.75	32-32.9	2.65
23-23.9	1.81	33-33.9	2.75
24-24.9	1.88	34-34.9	2.85
25-25.9	1.96	35 and above	2.95
26-26.9	2.05		

OIL FINANCE

Selling Pressure Spending Its Force

STOCKS not only touched bottom during the week, they scraped bottom. Even U. S. Steel got below 91 for the first time since December, 1917. Of the Oil issues, scarcely one of them on the regular list but joined in the progressive decline. A dozen or so recorded new lows for 1920. California Petroleum, Invincible Oil & Refining, Island Oil & Transport, Oklahoma Producing and Refining, Pure Oil, Royal Dutch, Shell Transport, Texas Pacific Coal & Oil, Union Oil and White Oil claimed this distinction. In nearly every instance these new lows were several points below those of 1919. Altogether it was a bear's market, narrow, professional, fitful and demoralizing. And this in face of the fact that the oil companies are doing the best business in years.

Has the Selling Movement Spent Itself?

There were not wanting evidences that the selling movement has spent, or is spending itself. For one thing, such speculative stocks as Mexican Petroleum, Pan American Petroleum, Royal Dutch and Texas Company showed marked diminution in the weekly turnover, which ran especially high the previous week. Furthermore, it is pointed out that the present bear movement has already equalled in duration and in extent that of 1917; and whereas the former standard of bear markets cancelled approximately 84 per cent of the previous major advance, this movement has cancelled all of the major upward movement and has also cancelled 80 per cent of that which had been gained the previous year.

No "Sore Spots" in the Financial Market

As to the immediate outlook, there is little talk of improvement until after the first of the year. Commodity liquidation must continue, in sane and orderly fashion, and the present tensity of the credit situation must give way gradually. Some dividends must be passed in the interest of cash conservation, and needless new financing must be discouraged. It will surprise many to learn that, even in this year of financial stress, in the ten months ended October 31, industrial financing broke all records, with an aggregate of $2,109,186,490 in bonds, notes and stocks, comparing with $1,683,271,110 in the same period of last year, which was a record-breaker up to that time. Finally, all bankers and financiers agree that there are no "sore spots" in the money situation. It is only a question of readjusting and waiting.

Recent Charters, Earnings, Issues, Statements, Briefly Told

Great Amer. Tank Car.—An offering of $3,000,000 equipment notes at prices to yield abou 8 per cent is on the market.

Houston Oil—Oil sales in October, $310,000; land sales, $90,000.

Pennok Oil—Gross, nine months ended September 30, $698,652; net, before depletion, depreciation and Federal taxes, $673,271.

Shaffer Oil & Refg.—Twelve months ending September 30, 1920; gross, $12,026,083; net, $4,260,768.

Skelly Oil—September earnings, $645,822, a new high record.

Sinclair Consolidated—Earnings for the three-quarters ended September 30, 1920, were approximately $26,500,000 as against $14,459,882 in same period of 1919; for third quarter, nearly $10,000,000, comparing with $3,896,331. Total earnings in 1919, $22,670,698, now running at the rate of about $40,000,000.

Galena-Signal Oil—An oversubscription has been announced by the managers of the syndicate which offered the $4,450,000 ten-year 7 per cent convertible gold debentures, due April 1, 1930. With the sale of these debentures this company's total authorized $6,000,000 issue is now outstanding.

Maracaibo Oil—Is reported to have in the neighborhood of $1,200,000 in its treasury, with a considerable portion of the hard work done. There are no bonds or preferred stock, and only 250,000 shares of no par value outstanding.

Lucey Manfg. Corp.—For the month of September, for the third quarter, and for the nine months ending September 30, 1920, shows an amount equal to over 10 times the interest charges on the $1,500,000 8 per cent sinking fund bonds and at the rate of $23.18 annually earned on the Class A stock.

New British Oil Capital.—Total authorized capital stock of oil companies chartered in Great Britain for nine months to September 30, 1920, was $55,641,128, comparing with $11,577,990 during the corresponding period of 1919.

Island Oil.—Funded indebtedness of $4,200,000 will be paid off shortly, is a current report. This done, the company will have only its common stock outstanding.

Ventura Consolidated. — Sales: 9 months ended September 30, 1920, $4,097,392; full year 1919, $3,491,859; full year 1918, $2,243,144. Nine months' production, 1920, 1,026,000 barrels; 1919, 825,006 barrels; 1918, 642,341 barrels.

Old Dominion Petroleum.—Stock of this company has been introduced on the New York Curb, rising from an initial quotation of 1½ and 1⅝ to 2 and 2⅛. Present dividends are 3 per cent quarterly. Its authorized capital is $1,500,000, par $1. C. C. McDonald, Wichita Falls, Texas, is president. Company has producing wells in the Burkburnett and Electra fields of north Texas and has holdings in the Kemp-Munger-Allen field, besides tracts on the north border of Red river in Oklahoma.

Texas Company.—According to John J. Mitchell, one of its directors, The Texas Company may decide on a plan of regular distribution of stock in the form of dividends instead of an annual increase of 20 per cent in stock at par. The company is in a strong financial position, with a surplus of $90,000,000.

Shell Transport.—W. H. Samuel, managing director of Shell Transport & Trading Company, who has been in the United States recently, said before sailing for home, "Most newspaper reports regarding the control of our company by the British government are wrong, and I wish this fact to be emphasized." On May 5 last he was quoted by the London Daily Mail as saying that "the British government had had opportunities over and over again to have British control in the Shell group, yet they had never taken it."

Kansas & Gulf.—This company, incorporated December 15, 1919, in Delaware, successor to Kansas & Gulf Producing & Refining Company of South Dakota, is offering at $16 a portion of its common stock out of an authorized capitalization of $15,000,000. Company's properties total 197,035 acres located in Kansas, Oklahoma, Louisiana, Texas, Alabama and Mexico.

Mexican Petroleum.—President E. L. Doheny estimates earnings for 1921 will exceed those of 1920 by 50 per cent and company's profits this year compare favorably with 1919. New contracts for

1921 production already made at prices some four times figures on which it furnished oil on old contracts.

Empire Refineries.—For the first eighth months of 1920, company showed increase in sales of 110 per cent in gasoline and of all products of 67½ per cent over corresponding period of 1919.

American Fuel Oil.—October earnings of American Fuel Oil & Transport Company were $930,743; net earnings, from steamship operations were about $490,000.

Union Oil (Delaware).—The recent increase of the regular quarterly dividend of Union Oil Company of California adds to the income of Union Oil (Delaware) from that source at the rate of approximately $250,000 a year. The Delaware company has acquired 3,705 additional acres of territory in West Virginia (2,631 acres in Jackson county), thereby increasing its present holdings in that state to a total of 31,715 acres. These new holdings were taken and will be operated by the Eddystone Oil Corporation, which is owned entirely by Union (of Delaware), and is operating in West Virginia, Ohio, Oklahoma, Kansas and California.

Sinclair Consolidated.—Purchase by this company of the petroleum plant at Ghent, Belgium, formerly owned by Sudan Freres, is another step in evolving a world-wide distribution of its products.

Aetna Petroleum Corp. — With the estimated earning of $1,000 a day for the refinery, which is indicated by the company's latest statement, gross earnings of $168,000 per month are indicated, or a yearly earning in excess of $2,000,000. The recent appraisal of the combined properties gives the Aetna stock a book value around $10 per share.

Pennok Oil.—September earnings were approximately $120,000 net.

Will Southern Pacific Form Oil Company?

Conjectures are many as to the probable course to be pursued by the Southern Pacific Railroad Company with regard to the disposal of its extremely valuable oil land holdings. The generally accepted understanding is that the segregation of its oil properties will take substantially the course adopted by the Great Northern in the distribution of its mining properties, namely, the organization of a holding or operating company. Whether this company will actively operate the properties or lease them to a large oil concern, like the Standard Oil or the Royal Dutch-Shell interests, is still problematical. In the latter event the securities of the new oil corporation would presumably be distributed to Southern Pacific shareholders on a pro rata basis. Whether the corporation will be required to reimburse the Southern Pacific for the $32,000,000 invested in the development of these properties, or whether the Southern Pacific will, in effect, present the investment to its shareholders and write off an equal sum from its profit and loss surplus, has not yet been disclosed. Such a plan would require the distribution of 3,014,629 shares against present outstanding Southern Pacific stock, and 461,035 additional shares, if all of the $46,103,500 convertible bonds were exchanged for stock in time to participate in the distribution. The total distribution of oil stock would, therefore, be 3,475,664 shares.

Invincible Oil Corporation Is Conserving Cash, Building Assets

Since its organization in the middle of 1919, the Invincible Oil Corporation has maintained a policy of paying no dividends but of conserving its cash and building up its assets. These, on August 31, 1920, amounted to $38,188,172, including an item of $6,203,341 for good-will. That it might have paid dividends is evident from the fact that its surplus, which on January 1, 1920, was $1,224,110, after depletion, depreciation, etc., has grown to $6,724,636 at August 31, before deductions for depletion, depreciation, dry wells, Federal taxes, etc. A statement of its earnings and consolidated balance sheet in some detail will be particularly interesting at this time.

Consolidated Income Account
January 1, 1920, to August 31, 1920

Gross earnings:	
Louisiana Oil Refining Corp.	$7,239,471
Invincible Oil Company	343,073
Montrose Oil Refining Co., Inc.	902,019
Gladstone Oil & Refining Co.	244,149
Louisiana Oil Exporting Co.	7,516
Invincible Oil Corporation	.....
Total gross earnings	$8,736,228
Deduct: Operating expenses:	
Louisiana Oil Refining Corp.	$1,183,650
Invincible Oil Company	232,402
Montrose Oil Refining Co., Inc.	543,266
Gladstone Oil & Refining Co.	149,493
Louisiana Oil Exporting Co.	2,738
Invincible Oil Corporation	467,040
Total operating expenses	$2,578,589
Total net earnings to August 31, 1920, carried to surplus, without provision for depletion, depreciation or Federal taxes	$6,157,639

Surplus Account

Surplus January 1, 1920	$3,717,081
Deduct: Depletion, depreciation, dry wells, etc., for 1919	2,492,971
Adjusted surplus January 1, 1920	$1,224,110
Add: Earnings to August 31, 1920	6,157,639
Surplus, August 31, 1920	$7,381,749
Deduct: Portion of surplus applicable to minority interest in subsidiary companies	657,113
Surplus August 31, 1920, without providing for depletion, depreciation, dry wells, Federal taxes, etc., for 1920	$6,724,636

CONSOLIDATED BALANCE SHEET AT AUGUST 31, 1920

Assets

Current:	
Cash	$ 556,376
Accounts receivable	1,116,103
U. S. Liberty bonds and W. S. S.	36,963
Notes receivable	19,788
Inventories:	
Oil in storage (at pipe line prices) $1,904,514; materials and supplies (at cost), $629,385	2,533,899
Total current assets	$4,263,129
Trustees for sinking fund	42,788
Good-will	6,203,341
Investments: Stock in subsidiary companies	12,674,735
Capital: Lands, buildings, leases, wells, fixtures, etc.	14,764,610
Deferred: Prepaid expenses	239,567
Total assets	$38,188,171

Liabilities

Current:	
Accounts payable	$ 893,029
Notes payable	1,097,500
Accrued expenses	111,543
Total current liabilities	$2,102,072
*Louisiana Oil Refining Corp. mortgage bonds, due May, 1920	1,000
One-Year 7% Notes, due March, 1921	1,959,000
Esperson & Bonner notes, due 1920 to 1924	3,900,000
**Invincible Oil Company, note, due December, 1920	300,550
***Tank car equipment notes	1,085,959
Accrued interest: One year 7% notes, $66,403; Esperson & Bonner notes, $292,500; Tank Car Equipment notes, $855	359,757
Capital Stock: Invincible Oil Corp. (authorized $50,000,000)	18,273,100
Minority interest in subsidiaries:	
Capital stock	873,753
Portion of surplus applying to above capital stock	657,112
Reserve accounts	1,951,229
Surplus	6,724,636
Total liabilities, capital and surplus	$38,188,171

*Called for payment but not presented.
**Being reduced $10,000 monthly
***Being reduced $33,000 monthly.

Invincible Oil Corporation now owns or controls thru its subsidiaries approximately 120,000 acres in Texas, Louisiana, Oklahoma and Arkansas; a refinery in Fort Worth, 4,000 barrels daily capacity, and a topping plant at Shreveport, La., 5,000 barrels capacity. It owns and operates tank cars to the total number of 811. It has over 150 miles of pipe lines, with pumping equipment. Its combined storage capacity is 1,033,500 barrels. Combined net production for eight months ended August 31, 1920, was 2,272,019 barrels. It has 880 employes.

F. Douglas Cochrane is chairman of the board; E. R. Ratcliff, president; H. M. Journee and J. B. Shearer, vice presidents; Maxwell Stevenson, treasurer; R. H. Frost, assistant treasurer; Samuel Vaughn, secretary, and Jacques Cohen, assistant secretary. Directors are Francis R. Mayer, Jules S. Bache, Louis DuPont Irving, Craig Colgate, Sol Wexler, S. M. Schatzkin, R. H. Munson and Maxwell Stevenson, all of New York City; F. Douglas Cochrane, John F. Perkins, John B. Shearer and Chandler M. Wood, of Boston, Mass.; E. R. Ratcliff, of Shreveport; Niels Esperson, of Houston, and W. W. Hepburn, of Philadelphia.

By Special Correspondent

PITTSBURGH, Nov. 22.—Heavy liquidation by speculative holders last week weakened Marland Refining, Kay County Gas and Arkansas Natural Gas, and all three issues fell to new low records for all time. Arkansas Natural Gas touched 8½, as against 45 last January; Marland now sells at 3, as against 8 last year, and Kay Gas is 1⅜, as against 3 a year ago. Guffey-Gillespie Oil recently fell $6 to 25⅝, where it is within a trifling fraction of its low. In the past month Ohio Fuel Oil has declined $6 to 19, and Manufacturers' Light & Heat $8 to 52, and this trio is regarded quite well entrenched, while the Marland issues and Arkansas Gas never have been well distributed. Lone Star Gas, Ohio Fuel Supply and Oklahoma Natural Gas have held up remarkably well, all things considered.

How Oil Shares Moved Last Week

NEW YORK STOCK EXCHANGE

	Par Value	High 1920	Low 1920	Week's Sales	Price Nov. 13	Week's High	Week's Low	Price Nov. 19	Week's Gain or Loss
Caddo Oil & Refg	$100	28¼	10¼	5,800	16	16	13½	14	—2
California Petrolaum	100	46	16	6,500	20	20¼	16	†16	—4
Cosden & Co	No par	43⅜	30	8,100	35	35¾	33	33¼	—1¾
Houston Oil	100	116½	75	15,200	85⅜	89½	78	79⅜	—5¼
Invincible Oil & Refg	50	47⅛	23½	23,800	26⅛	27⅛	†22½	23½	—2⅝
Island Oil & Tr	10	7¼	4⅜	53,900	5	5½	4⅜	†4⅜	—⅛
Mex. Petroleum (b)	100	222	148	133,700	**161¼	166¾	152⅛	153	—8¼
Middle States Oil	10	71¾	10¼	43,400	12½	13⅛	11⅞	11⅞	—⅝
Okla. Prod. & Refg	5	5¾	3⅜	20,700	3½	3⅝	3⅜	†3⅜	—⅛
Pan.-Amer. Petroleum	50	116⅜	71¾	76,600	(a)76½	79	72½	73	—3½
Phillips Petroleum	No par	44½	30½	6,900	32½	32½	30½	†30½	—2
Pierce Oil Corp	25	23¼	11	7,800	12⅝	13	11½	11⅝	—1
Pure Oil Co	25	42⅞	31¾	31,400	36⅛	37	30	†30¾	—4⅜
Royal Dutch, N. Y.	$13.40	123⅜	65½	33,900	69¾	71½	65⅛	†65½	—4¼
Shell Transport	£2	*90¼	43¾	6,600	45⅛	47	43⅛	†43⅜	—2
Sinclair Consol	No par	48¾	23⅛	109,400	25¾	26½	25	25	—¾
Standard Oil, N. J	100	850	600	Odd lots	615	640	610	625	+10
do. pfd	100	113⅜	100⅛	4,300	105	105⅜	104⅞	104⅞	—⅞
Texas Company (new)	25	**53⅜	40¼	110,100	46⅞	48½	46	46	—⅞
Texas Pac. C. & O	10	53⅜	25½	10,900	25½	27½	24¾	25½	.....
Transcontinental Oil	No par	38¾	9	14,200	10¼	10¼	9	9	—1¼
Union Oil	No par	38	21½	15,100	25	25½	21½	†21½	—3½
White Oil	No par	25½	18	19,600	19	19½	17	†18	—1

**Reduced to basis of $25 par. *Ex-rights. (a)Ex-dividend 5 per cent Class B stock. †New low.

NEW YORK CURB MARKET

Cities Serv. Bkrs	No par	44⅛	29½	1,600	.....	33¾	31½	31½	.....
Elk Basin	5	11¼	6½	9,000	8¾	8¾	8	8	—¾
Federal Oil	5	4¾	2	15,500	2¼	2¼	2	2⅛	—⅛
Glenrock Oil	10	4¾	1⅜	17,200	.....	2⅛	2	2⅛	.....
Guffey-Gillespie	No par	39¼	25¾	1,700	27¾	28¾	27	27	—¾
Intern. Petroleum (new)	5	18⅛	14½	13,700	15½	15½	†14	14½	—1
Merritt Oil	10	22⅛	10¾	4,800	12⅜	12¾	11½	11½	—⅞
Midwest Refg	50	190	128	4,050	146	150	143	143	—3
N. Am. O. & R	5	5⅝	2	No sales reported.					
Pennok Oil	10	9½	5	5,200	.....	6¾	6¼	6½	.....
Prodrs. & Refrs	10	10½	5⅝	9,300	5⅞	6	5⅜	5⅜	—½
Sapulpa Refg	5	7¼	4½	1,100	.....	5	4⅞	.....	.....
Salt Creek Prod.(new) (c)	.....	14¼	10	1,200	11¾	11¾	10	†10	—1¾
Simms Petroleum	No par	73½	7½	32,200	7½	9⅛	†7⅜	8⅛	+⅜

(b)New stock. (c)Unlisted. †New low.

PITTSBURGH STOCK EXCHANGE

Arkansas Nat. Gas	10	45	9	8,480	10	10¼	*9	9	—1
Barnsdall Corp. A	25	50	36	175	38	37	36	36	—1
Barsndall Corp. B	25	46	35	No sales reported.					
Guffey-Gillespie Oil	No par	40	25½	4,515	28	28	25⅝	25⅝	—2⅜
Kay County Gas	1	2½	1½	36,206	1¾	1¾	*1⅜	1½	—¼
Lone Star Gas	25	45½	25	527	29½	29¾	29	29	—½
Man. Light & Heat	50	61¾	48½	680	52	53	52	53	+1
Marland Refining	5	6½	3	24,134	3⅜	3⅜	*3	3	—⅜
Ohio Fuel Oil	1	34⅞	19	430	22	21½	19	19	—3
Ohio Fuel Supply	25	55	44	964	48	48⅝	46	46	—2
Oklahoma Nat. Gas	25	43	29⅞	1,569	30	30¼	29½	29½	—½
Oklahoma Prod. & Refg	5	6½	3½	100	.....	3½	3½	3½	.....
Pittsburgh Oil & Gas	5	16	10	930	11¾	12	11¾	11⅞	+⅛
Paragon Refining	25	27¾	26	25	27	27½	27½	27½	+½
Union Nat. Gas	100	130	117	70	120	120	120	120	.....
Col. Gas & Elect	100	65	54	.....	56½	No sales reported.			
Middle States Oil	10	18½	12⅝	.....	12⅞	No sales reported.			
Phila. Co. 6s	50	35	31	.....	31	No sales reported.			
Transcontinental Oil	No par	37⅝	9¾	208	.....	10	9¾	9¾	.....

*New low record.

PITTSBURGH CURB MARKET

Allied Oil	1	1.25	.19	No sales reported.					
Atlantic Pet	5	3¾	3	No sales reported.					
Boston-Wyoming	1	1.25	.62	No sales reported.					
Columbia Syn	10	11	6	No sales reported.					
Duquesne Oil	5	7½	2	1,370	2¼	2¼	2	2	—¼
Homer Union Pet	1	1.25	.06	1,900	.08	.09	.08	.08	.....
Liberty-Texas	100	1.25	.08	No sales reported.					
Gulf Oil Cor	100	475	400	No sales reported.					
Marshall Oil	10	13½	7	100	9	9	9	9	.....
Mexico-Wyoming	1	1.45	.40	200	.40	.40	.40	.40	.....
Omar Oil & Gas	10	7½	2¾	100	2¾	2⅞	2⅞	2⅞	+⅛
States Oil	5	160	30	.....	46	No sales reported.			
Salt Creek Consol	10	21	12	2,205	12½	14	13	13½	+1
Tropical Oil	25	23	16	No sales reported.					
Twin City Oil	1	30	.08	13,350	.09	.09	.07	.08	—.01

Standard Oil Stocks

Standard Oil securities are dealt with to only a small extent on the New York curb market, the great majority of sales being made over the counters of investment bankers. For this reason no record can be obtained of the total volume of sales from day to day to indicate the activity of any particular stock. Below are bid and asked quotations prevailing on the curb market at the close of business on the date given, the same quotations prevailing in the majority of unrecorded transactions:

STANDARD OIL GROUP

	Nov. 20 Bid	Nov. 20 Asked	1920 High	1920 Low
Anglo-American	†18½	19½	31	18½
Atlantic Refg	†950	1050	1650	950
Buckeye Pipe	87	90	102	84
Continental Oil	107	112	(b)575	530
Galena-Signal	48	52	97	40
Illinois Pipe	164	169	178	100
Ohio Pipe	285	290	395	270
Penn.-Mex	.....	.....	74	38
Prairie Oil & Gas	†505	515	690	505
Prairie Pipe	200	210	280	188
South Penn	†240	250	345	240
S. O. California	312	317	338	297
S. O. Indiana	685	695	780	640
S. O. Kansas	610	630	750	500
S. O. Kentucky	370	400	485	325
S. O. New York	355	365	460	280
S. O. Ohio	400	415	560	400
Union Tank Line	†100	105	115½	100
Vacuum Oil	†305	315	435	305

(b) Before stock dividend. †New low.

UNLISTED SECURITIES

By Carl H. Pforzheimer & Co.

	Par Value	Nov. 19 Bid	Nov. 19 Asked	1920 High	1920 Low
Gulf Oil Corp.	$100	†390	400	550	390
Humble O. & R.	100	235	245	323	225
Magnolia Pet.	100	350	360	450	315

†New low.

MISCELLANEOUS STOCKS

The following are bid and asked prices ruling at the close of business on the date given, on the stock markets indicated by reference marks, with high and low levels reached so far this year:

	Par Value	Nov. 19 Bid	Nov. 19 Asked	1920 High	1920 Low
Cities Serv. (a)	$100	290	295	....	.....
do. pfd. (a)	100	....	....	74	64
Nat. Refg. (a)	100	110	120	*410	355
do. pfd. (a)	100	....	....	126	97
Paragon Refg. (a)	25	25	27	27½	25
do. pfd. (a)	100	....	95	100½	96
Ind'h'ma Refg. (c)	5	6.75	6.87½	....	.....
Marland Refg. (c)	5	2.87½	3.00	....	.....

*Before stock dividend. (a)Cleveland. (c)St. Louis